

# Rhodora

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### STUDIES IN THE FLORA OF BOLIVIA — IV

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Continued from Vol. 68, No. 774

#### 29. *Dissanthelium* Trin.

Annual or perennial, the plants seldom over 10 cm. high, caespitose. Leaves glabrous, the blades flat or involute. Inflorescence a short, terminal, racemose panicle, spicate in appearance. Spikelets mostly 2-flowered, occasionally 3-flowered or 1-flowered, the naked rachilla disarticulating above the glumes and prolonged beyond the uppermost floret; glumes equal, longer than the lemmas; glumes and lemmas awnless.

a. Glumes 3 (-3.5) mm. long.

b. Lemma puberulent, obtuse, with a central mucro. .... 1. *D. macusaniense*.

b. Lemma scabridulous, obtuse, but not toothed. .... 2. *D. calycinum*.

a. Glumes 5 mm. long.

c. Inflorescence 5-7 mm. broad, compact; spikelets numerous. .... 3. *D. peruvianum*.

c. Inflorescence less than 5 mm. broad, lax, spikelets few. .... 4. *D. Trollii*.

1. *Dissanthelium macusaniense* (Krause) Foster and Smith in *Phytologia*, 12: 249 (1965). *D. minimum* Pilger in Engler, Bot. Jahrb. 56, Beibl. 123: 28 (1920). Annual, the leaf-blades flat. Inflorescence 1-2 cm. long, more or less oblong, the rachis, branches and pedicels only faintly scabridulous. Spikelets mostly 2-flowered. Lemma about 2.5 mm. long. POTOSÍ: CERCADO: Potosí, 4000 m., Cárdenas 198 (GH).

2. *D. calycinum* (Presl) Hitchc. in Journ. Wash. Acad. Sci. 13: 224 (1923). Perennial. Inflorescence to 3 cm. long, oval, rachis, branches and pedicels puberulent-scabridulous. Spikelets 2-flowered. Lemma about 2.5 mm. long. Without locality: Bang 1873 (GH).

3. *D. peruvianum* (Nees & Meyen) Pilger in Engler, Bot. Jahrb. 37:



378 (1906). Perennial. Apparently differs from *D. calycinum* primarily in having longer glumes and in spikelets frequently 1-flowered. LA PAZ: LARECAJA: Sorata, *Mandon* 1345 (GH).

4. *D. Trollii* Pilger in *Notizbl.* 11: 778 (1933). Perennial, about 5 cm. tall. Leaves with flat pungent blades to 4.5 cm. long (usually shorter) and 2 mm. wide. Inflorescence narrow, about 2 cm. long (2.5 cm. on the type), the rachis glabrous to scabridulous, pedicels scabridulous, sometimes almost glabrous, or scabrid on the margins and angles. Spikelet to 5 mm. long, 2-flowered. Glumes as long as the spikelet, acute to very acute. Lemmas 4 mm. long, hyaline. Palea hyaline, nearly as long as the lemma, bicarinate, slightly bidentate, the teeth obtuse (when flattened). LA PAZ: MURILLO: Chacaltaya, 4800 m., *Buchtien* 1197 (US); La Cumbre, 5000 m., *Tate* 10 (US), *Parodi* 10042a (US); La Union, 4800 m., *Troll* 1966 (US; type-number).

### 30. *Koeleria* Pers.

*Koeleria cristata* (L.) Pers. *Synops. Pl.* 1: 97 (1805). *K. gracilis* subsp. *boliviensis* (Domin) Domin in *Biblioth. Bot.* 65: 237 (1907). *K. pseudocristata* var. *andicola* Domin in *Fedde, Rep. Sp. Nov.* 2: 94 (1906). Perennial, to 5 dm. high, the culms pubescent. Leaves mostly basal, the sheaths from nearly glabrous to pubescent, the flat blades pubescent, at least when young. Inflorescence a dense, terminal, racemose panicle, to 10 cm. long, interrupted at the base, the rachis, branches and pedicels pubescent. Spikelets 2-4-flowered, about 6 mm. long, the rachilla villous, disarticulating above the glumes. First glume 4.5 mm. long, 1-nerved, scabridulous on the nerve; second glume 5 mm. long, 3-nerved, the keel scabridulous. Lowest lemmas 5 mm. long, bidentate, with a 4 mm. awn arising from the base of the sinus, the keel and awn scabridulous. Palea about 4 mm. long, bidentate, the keels ciliolate. LA PAZ: NOR YUNGAS: Pongo, 3640 m., *Hitchcock* 22767 (GH).

With the form described here, there is also to be found one in which leaves and culms are more densely pubescent and the lemmas are awnless or, at most, shortly mucronate. Both forms are found on the Gray Herbarium sheet of *Hitchcock* 22767.

### 31. *Trisetum* Pers.

Perennials, 1-5 dm. high, rarely to 1 m., the leaves and culms glabrous, the leaf-blades involute or flat and sometimes scabridulous. Inflorescence a terminal, dense, racemose panicle, spicate in appearance, interrupted at the base, 2-15 cm. long. Spikelets 2-3-flowered, unilateral, fertile florets below the sterile, disarticulating above the unequal glumes; lemmas awned.



Glumes to 1 cm. long, acuminate, lemmas to 1.5 cm. long, rachilla glabrous. .... 1. *T. floribundum*.

Glumes to 5 mm. long, acute, lemmas about 5 mm. long or less, rachilla villous. .... 2. *T. spicatum*.

1. ***Trisetum floribundum*** Pilger in Engler, Bot. Jahrb. 37: 505 (1906). *Dielsiochloa floribunda* of the Catalogue. *Bromus Mandonianus* of the Catalogue. To 3 dm. high, leaf-blades involute. Panicle to 6 cm. long, more or less oval, branches and pedicels scabridulous. Spikelets (excluding awns) about 1.3 cm. long. First glume to 7 mm. long, second to 1 cm. Lemmas deeply bidentate, the narrow teeth resembling awns, the true awn to 1.5 cm. long. Palea to 1 cm. long, bidentate, the keels ciliolate. LA PAZ: LARECAJA: vic. Sorata; ad lacum Turiguana, 4500 m., Mandon 1371 (GH; type-number of *Bromus Mandonianus*).

2. ***T. spicatum*** (L.) Richt. Pl. Eur. 1: 59 (1890). *T. oreophilum* Louis-Marie in Rhodora, 30: 221 (1928). To 3 dm. high, rarely to 1 m., leaf-blades flat, leaves chiefly basal. Panicle narrow, to 15 cm. long, rachis, branches and pedicels pubescent. Glumes 3.5 and 4 mm. long, the keels scabridulous. Lemmas pubescent to villous, bidentate, the teeth not produced as pseudo-awns, the true awn about 3 mm. long. LA PAZ: MURILLO: La Paz, 3700 m., Buchtien 8540 (GH).

### 32. *Deschampsia* Beauv.

See Parodi in Darwiniana, 8: 415-475 (1949).

Perennial. Leaf-blades flat or folded. Inflorescence a dense to open racemose panicle, sometimes interrupted below. Spikelets 2-flowered, the villous rachilla prolonged beyond the upper floret, disarticulation above the glumes. Glumes equal or subequal. Lemmas thin to hyaline, the apex obtuse, 2-4-toothed, bearing a dorsal awn at or below the middle.

Panicle dense, the short branches appressed, interrupted below; awn much exceeding the lemma. .... 1. *D. conferta*.

Panicle lax, the branches long, not appressed; awn equaling or slightly exceeding the lemma. .... 2. *D. caespitosa*.

1. ***Deschampsia conferta*** (Pilger) Valencia in Revist. Argent. Agron. 8: 127 (1941). *Aira conferta* of the Catalogue. Plant to 10 dm. tall, usually shorter. Leaf-blades linear, flat, scabrid above and beneath, to 3 mm. wide. Panicle dense, to 20 cm. long, rachis glabrous or slightly scabridulous on the upper portion, branches and pedicels scabridulous. Spikelets to 5 mm. long (excluding the awns). Glumes to 5 mm. long, acute, the margins erosulous near the apex, the keel scabridulous. Lemmas about 3 mm. long, deeply bidentate, the teeth more or less acute; awn twisted for 1.5-2 mm., geniculate, scabrid, the whole to 5 mm. long. COCHABAMBA: CERCADO: north of Cochabamba, Hitchcock 22814 (US).



2. *D. caespitosa* (L.) Beauv. Ess. Agrost. 91, 149, 160 (1812). Plant to 1.2 m. tall, densely caespitose. Leaf-sheaths glabrous; blades linear, to 4 mm. wide, flat or folded, scabrid above. Inflorescence an open panicle, to 3 dm. long, the branches rather long, branches and pedicels scabridulous. Spikelets to 4 mm. long, the rachilla sometimes bearing a reduced floret at the apex. Glumes subequal, about 4 mm. long, obtuse and erose to acute, often purple-tinged, thin, obscurely nerved. Lemma 3 mm. long, hyaline, the apex usually several-toothed, the awn equaling or somewhat exceeding the lemma, but not markedly so; palea narrow, slightly shorter than the lemma.

No Bolivian material has been seen. The species is included on the authority of Parodi, l. c., who cites a specimen (collector unknown) from the vicinity of the city of Santa Cruz de la Sierra.

### 33. *Avena* L.

Annuals up to 7.5 dm. high, the leaf-blades flat, to 4-8 mm. wide, scabrid, occasionally pilose. Panicle lax, the branches distant, racemose, to 25 cm. long, rachis and branches glabrous, the pedicels sometimes puberulous-scabridulous. Spikelets 2-3-flowered, the rachilla villous, disarticulating above the nearly equal, many-nerved, papery glumes; lemmas bidentate, villous on the lower portion at least, awned, the awn arising from mid-lemma or below.

Pedicels spreading, glumes to 2.5 cm. long, lemmas about 2 cm. long, acute. .... 1. *A. fatua*.

Pedicels flexuous, glumes to 2 cm. long, lemmas about 1.5 cm. long, the teeth setaceous. .... 2. *A. barbata*.

1. *Avena fatua* L. Sp. Pl. 80 (1753). Spikelets (excluding awns) about 2.5 cm. long. Awn to 3.5 cm. long. COCHABAMBA: CERCADO: Cochabamba, Hitchcock 22836 (Hitchcock).

2. *A. barbata* Brot. Fl. Lusit. 1: 108 (1804). Spikelets (excluding awns) about 1.5-2 cm. long. Awns to 3 cm. long. LA PAZ: MURILLO: Palca, Pflanz 2541 (Hitchcock).

### 34. *Holcus* L.

*Holcus lanatus* L. Sp. Pl. 1048 (1753). Perennial, to 1 m. high. Leaf-sheaths, blades and culms pubescent, the blades flat, about equal to the base of the mature inflorescence, to 6 mm. wide. Inflorescence a terminal, racemose, dense panicle to 10 cm. long, the rachis, branches and pedicels pubescent. Spikelets 2-flowered, the lower floret perfect, the upper staminate, 1 spikelet sessile, 1 pedicellate, the rachilla glabrous, disarticulation above the equal glumes, these to 3.5 mm. long, exceeding the florets, the first obscurely 3-nerved, the keel and upper margins ciliate, the second 3-nerved, broader, keel and margins ciliate,



both glumes mucronulate. Pistillate lemmas 2 mm. long, nerveless, awnless, obtuse, shining, the palea as long as its lemma, the keels ciliolate. Staminate lemmas 2 mm. long, nerveless, with a 1.5 mm. stout hooked awn at apex, the palea shorter than its lemma, the keels ciliolate. LA PAZ: MURILLO: La Paz, 3300 m., *Bang* 155 (GH). COCHABAMBA: TOTORA: Pocona, 2500 m., *Steinbach* 8671 (GH).

### 35. *Danthonia* Lam. & DC.

*Danthonia cirrhata* Hack. & Arech. in Arech. Gram. Uruguay, 307 (1894). Perennial, to 6 dm. tall, nodes glabrous. Leaves sparsely papillate-hirsute on sheaths and blades, the narrow blades involute, seldom equaling the inflorescence. Inflorescence a narrow panicle usually less than 10 cm. long, few-flowered. Spikelets several-flowered, the uppermost floret sterile; disarticulation above the glumes; axis glabrous to puberulent, the pedicels puberulent and often pilose at the base. First glume to 1.5 cm. long, long-acute, glabrous, 5-nerved, the central nerve prominent, margins thin to hyaline; second glume similar, about 2 mm. shorter. Rachilla long-plumose at the base, hairs to 5 mm. long, white. Fertile lemmas to 6 mm. long, pilose near margin below the middle, deeply bidentate, the teeth produced as pseudo-awns 5 mm. long, a true awn, twisted, to 1 cm. long, arising at base of sinus between teeth. Palea thin, to 4 mm. long, the 2 keels briefly ciliolate. SANTA CRUZ: VALLEGRANDE: Samaipata, *Herzog* 1706, 3012 (Henrard).

### 36. *Lamprothyrus* Pilger

*Lamprothyrus Hieronymi* (O. Ktze.) Pilger in Engler, Bot. Jahrb. 37: 58 (1906). *L. Hieronymi* var. *tinctus* Pilger in Engler, Bot. Jahrb. 37: 59 (1906). Perennial, to 2 m. high, leaf-sheaths glabrous, the blades long, involute, scabrid on the upper surface, often nearly equaling the mature inflorescence, the old sheaths ultimately coiled at base of plant. Inflorescence a terminal, racemose panicle to 30 cm. long, fairly open at maturity, rachis glabrous, branches and pedicels often scabridulous. Spikelets (excluding awns and pseudo-awns) about 7 mm. long, with up to 6 florets, the uppermost reduced, disarticulation above the glumes, rachilla villous. Glumes equal or subequal, to 6 mm. long, transparent, without apparent nerves. Body of lemma 3 mm. long, villous, bidentate, the teeth produced as pseudo-awns to 1.7 cm. long, the true awn from the base of the sinus, geniculate shortly above its base, to 2 cm. long. Palea 3 mm. long, keels ciliate, villous between the keels and the margins. LA PAZ: LARECAJA: vic. Sorata; San Pedro, 2650 m., *Mandon* 1360 (GH). SANTA CRUZ: VALLEGRANDE: Cerro La Negra, 1700 m., *Steinbach* 8171 (GH); SARA: Cerro Hosana, 1000 m., *Steinbach* 3453 (GH). TARIJA: ARCE: Bermejo, 1400 m., *Fiebrig* 2099 (GH; type-number of *L. Hieronymi* var. *tinctus*).



37. *Calamagrostis* Adans.

See Tovar in Mem. Mus. Hist. Nat. Javier Prado, no. 11: 3-88 (1960).

Perennials. Leaves flat or involute. Inflorescence a panicle, often reduced and condensed. Spikelets disarticulating above the glumes, 1-flowered, with the rachilla more or less prolonged as a bristle behind the palea. Glumes usually more or less equal. Lemma usually shorter than the glumes, thinner-textured, with a dorsal awn (1 species awnless), callus more or less pilose or glabrous, the hairs of varying lengths.

- a. Lemmas awnless. .... 3. *C. calderillensis*.
- a. Lemmas awned.
  - b. Lemmas stipitate below callus.
    - c. Panicle very open, not spicate. .... 2. *C. eminens*.
    - c. Panicle dense, spicate.
      - d. Panicle elongate, slender; awn geniculate. .... 4. *C. amoena*.
      - d. Panicle short, thick; awn straight.
        - e. Awn shorter than the lemma. .... 7. *C. chrysantha*.
        - e. Awn exceeding the lemma, mostly by 1 mm. .... 8. *C. ovata*.
  - b. Lemmas sessile below the callus.
    - f. Rachilla glabrous or with a tuft of hairs at the apex only.
      - g. Rachilla glabrous. .... 6. *C. rigescens*.
      - g. Rachilla with an apical tuft of hairs.
        - h. Rachilla 2 mm. long; awn 9 mm. long. .... 27. *C. longiaristata*.
        - h. Rachilla 1 mm. long; awn 6 mm. long. .... 30. *C. viridiflavescens*.
    - f. Rachilla villous.
      - i. Awn 2-2.5 mm. long.
        - j. Spikelet 3 mm. long. .... 29. *C. polygama*.
        - j. Spikelet 5-8 mm. long.
          - k. Spikelet to 5 mm. long. .... 13. *C. curvula*.
          - k. Spikelet to 8 mm. long. .... 31. *C. spicigera*.
      - i. Awn 4 mm. or more in length.
        - l. Awn less than, equaling, or only slightly exceeding the lemma.
          - m. Inflorescence narrow, dense. .... 10. *C. cryptolopha*.
          - m. Inflorescence lax.
            - n. Rachilla 1.5 mm. long, the longest hairs to 1.5 mm. long. .... 19. *C. tarijensis*.
            - n. Rachilla 2-2.5 mm. long, the longest hairs to 4 mm. long. .... 23. *C. intermedia*.
        - l. Awn distinctly exceeding the lemma.
          - o. Inflorescence lax, sometimes spreading.



- p. Panicle about 1 dm. long. .... 18. *C. tarmensis*.
- p. Panicle 2 dm. or more in length.
- q. Lowest branches of panicle naked for 2-5 cm.
- r. Spikelets to 7-8 mm. long; rachilla-hairs to 2 mm. long. .... 1. *C. leiophylla*.
- r. Spikelets to 5-6 mm. long; rachilla-hairs to 4 mm. long. .... 22. *C. Orbignyana*.
- q. Lowest branches of panicle spikelet-bearing from nearly the base.
- s. Rachilla-hairs to 1.5 mm long. .... 26. *C. recta*.
- s. Rachilla-hairs to 4 mm. long. .... 21. *C. antoniana*.
- o. Inflorescence dense, sometimes interrupted, but not spreading.
- t. Panicle over 10 cm. long.
- u. Spikelets 4 (-4.5) mm. long. .... 5. *C. heterophylla*.
- u. Spikelets 6-8 mm. long.
- v. Spikelets to 6 mm. long; callus glabrous or nearly so, if a few hairs present, the longest to 0.4 mm. long. .... 28. *C. densiflora*.
- v. Spikelets 8 mm. long; callus somewhat villous, the longest hairs to 1 mm. long. .... 11. *C. glacialis*.
- t. Panicle less than 10 cm. long.
- w. Panicle less than 2 cm. long.
- x. Inflorescence narrow, spicate. .... 24. *C. minima*.
- x. Inflorescence dense, ovoid. .... 15. *C. curta*.
- w. Panicle 2 cm. or more in length.
- y. Panicle not interrupted, or only slightly so at the base.
- z. Pedicels villous. .... 12. *C. Jamesonii*.
- z. Pedicels scabridulous to pubescent, or nearly glabrous.
- aa. Callus densely villous, the longest hairs 1 mm. long. .... 16. *C. brevifolia*.
- aa. Callus sparsely short-villous, the longest hairs 0.5 mm. long. .... 9. *C. vicunarum*.
- y. Panicle obviously much interrupted.
- bb. Panicle to 2.5 cm. long. .... 14. *C. cephalopora*.
- bb. Panicle 4-9 cm. long.
- cc. Awn to 7 mm. long. .... 20. *C. Fiebrigii*.
- cc. Awn to 4 mm. long.
- dd. Rachis, branches and pedicels glabrous. .... 17. *C. violacea*.
- dd. Rachis, branches and pedicels sparsely scabrid. .... 25. *C. trichophylla*.



1. *Calamagrostis leiophylla* (Wedd.) Hitchc. in Contrib. U. S. Nat. Herb. 24: 367 (1927). *C. toluccensis* var. *laxiflora* O. Ktze. Rev. Gen. 3(2): 345 (1898). Caespitose, erect, 0.5-1 m. high. Leaf-sheaths glabrous to scabridulous, ligule less than 1 mm. long; leaf-blades flat to subinvolute, to 2.5-3 mm. wide. Inflorescence to 3 dm. long, narrow but lax, at least the lowermost branches whorled, axis glabrous below to sparsely scabridulous above, the branches, branchlets and pedicels scabrid. Spikelets to 5-8 mm. long. Glumes to 5-8 mm. long, acute, obscurely nerved, the keel prominent, scabrid. Lemma sessile below the callus, about 2 mm. shorter than the glumes, bidentate, scabridulous; callus glabrous to sparsely short-villous, rachilla about 2 mm. long, the longest hairs about 2 mm. long, not quite equaling the lemma; awn geniculate, to 5-6 mm. long, inserted at the middle of the lemma and exceeding it. COCHABAMBA: CERCADO: Cochabamba, *Holway* 379 (US).
2. *C. eminens* (Presl) Steud. Nomencl. (ed. 2) 1: 250 (1840). *C. elegans* (Wedd.) Henrard in Meded. Rijks Herb. Leiden, no. 40: 61 (1921). *Deyeuxia polystachya* Wedd. in Bull. Soc. Bot. France, 22: 177, 178 (1875). *C. eminens* var. *tunariensis* O. Ktze. Rev. Gen. 3(2): 344 (1898). *C. eminens* var. *sordida* O. Ktze. Rev. Gen. 3(2): 344 (1898). Caespitose, somewhat rhizomatous, stout, to 1 m. high, in damp or wet places. Leaf-sheaths glabrous, ligule to 1.8 cm.; leaf-blades involute, finely scabridulous to glabrous. Inflorescence open, to 3 dm. long, the spikelets glomerulate or subglomerulate at the ends of branches and branchlets, the rachis, whorled branches and pedicels glabrous to scabridulous. Spikelets to 4-5.5 mm. long. Glumes to 4-5.5 mm. long, acute and erosulous to subobtuse, the keel faintly prominent. Lemma distinctly stipitate below the callus, about 1 mm. shorter than the glumes, obtuse or truncate and erosulous at the apex; callus densely villous, with hairs up to 3 mm. long; rachilla about 1.5 mm. long, long-villous, the hairs chiefly basal; awn delicate, straight, equaling or shorter than the lemma, inserted below the middle of the lemma. LA PAZ: LARECAJA: vic. Sorata; Chicani, 3600-3800 m., *Mandon* 1309 (GH), 1310 (GH; co-types of *Deyeuxia elegans*). COCHABAMBA: ARANI: pass, Cordillera de Cochabamba, 4500 m., *Eyerdam* 24850 (GH).
3. *C. calderillensis* Pilger in Engler, Bot. Jahrb. 42: 72 (1908). Plant to 13 dm. tall. Leaf-sheaths glabrous, ligule about 3 mm. long; leaf-blades flat to somewhat inrolled, to 7 mm. wide, the margins scabrid, otherwise glabrous above and beneath. Inflorescence to 22 cm. long, the rachis, whorled branches and pedicels glabrous. Spikelets to 4 mm. long. Glumes to 4 mm. long, the second glume longer than the first, acute to subobtuse. Lemma as long as the first glume, sessile below the callus, obtuse or truncate; callus glabrous, with an apical ring of short, sparse, fine hairs; rachilla 0.5 mm. long, sparsely villous, the longest hairs less than 1 mm. long, not reaching the middle



of the lemma; awn lacking. TARIJA: CERCADO: Calderillo, 3300 m., *Fiebrig* 3172 (US; type-number).

4. *C. amoena* (Pilger) Pilger in Engler, Bot. Jahrb. 42: 60 (1908). *C. filifolia* (Wedd.) Pilger in Engler, Bot. Jahrb. 42: 67 (1908). To 6 dm. high. Leaf-sheaths glabrous, ligule to 3 mm. long; leaf-blades involute, filiform, minutely scabridulous. Inflorescence 6-15 cm. long, somewhat lax, rachis glabrous below, scabrid above, the whorled branches, branchlets and pedicels scabridulous to scabrid. Spikelets to 5-5.5 mm. long. Glumes to 5-5.5 mm. long, long-acute, entire, the faintly prominent midrib keeled and scabridulous above. Lemma shortly stipitate below the callus, as long as the first glume, scabridulous, with 3-4 very slender, short, apical teeth; callus villous at the apex, the longest hairs 1 mm. long; rachilla to 2 mm. long, the upper portion bristle-like, moderately villous, the longest hairs to 1.5 mm. long, reaching  $\frac{2}{3}$  the length of the lemma; awn geniculate, to 4.5 mm. long, much exceeding the lemma, the base twisted, the upper portion straight, inserted well below the middle of the lemma. LA PAZ: LARECAJA: vic. Sorata; Marcamocreani, 3500-3600 m., *Mandon* 1306 (GH); NOR YUNGAS: Milliguaya, 2700-3900 m., *Mandon* 1301 (GH); MURILLO: Talca Chuquiaguilla, *Bang* 805 (GH; type-number).

5. *C. heterophylla* (Wedd.) Pilger in Engler, Bot. Jahrb. 42: 64 (1908). *C. boliviensis* Hack. in Fedde, Rep. Sp. Nov. 6: 156 (1908). Plants to 8 dm. tall. Leaf-sheaths usually glabrous, the ligule to 5 mm. long; blades linear, flat, about 2-4 mm. wide, usually shorter than the inflorescence, glabrous to scabridulous or somewhat short-pilose above and beneath, at least when young. Panicles to 2 dm. long, narrow, dense, interrupted (mostly on the lower half), rachis and branches glabrous, pedicels scabrid, the branches short. Glumes to 4 (-4.5) mm. long, acute, the narrow keel scabridulous. Lemma sessile below the callus, about 0.5-1 mm. shorter than the longer glume, with 3 slender apical teeth, the lateral teeth shorter than the central tooth; callus sparsely short-villous, the hairs not over 0.5 mm. long; rachilla 0.5-1 mm. long, sparsely villous, the longest hairs not over 1 mm. long, about  $\frac{1}{3}$  the lemma-length; awn geniculate, to 5.5 mm. long, loosely twisted at the base, inserted at or below the middle of the lemma. LA PAZ: MURILLO: La Paz, 3700 m., *Buchtien* 8834 (GH).

6. *C. rigescens* (Presl) Scribner in Rept. Missouri Bot. Gard. 10: 37 (1899). *Deyeuxia imberbis* Wedd. in Bull. Soc. Bot. France, 22: 177, 180 (1875). Caespitose, rhizomatous, to 3 dm. tall. Leaf-sheaths glabrous, ligule to 1 mm. long; blades involute, shorter than inflorescence, glabrous to somewhat scabridulous. Inflorescence to 1 dm. long, narrow, the branches short, interrupted below, rachis usually glabrous below, puberulent-scabridulous above, branches and pedicels puberulent-scabridulous. Glumes to 5 mm. long, acute, the green midrib keeled and scabridulous above. Lemma about 0.5 mm. shorter than glumes, sessile below the callus, with 3-4 fine, short, apical teeth;



callus sparsely short-villous, the hairs less than 0.5 mm. long; rachilla glabrous, to nearly 2 mm. long; awn straight, to 4-4.5 mm. long, inserted at the middle of the lemma. LA PAZ: MURILLO: near La Paz, 3300 m., *Bang* 104 (GH).

**C. chrysantha** (Presl) Steud. Nomencl. (ed. 2) 1: 250 (1840). *Deyeuxia phalaroides* Wedd. in Bull. Soc. Bot. France, 22: 177, 180 (1875). *D. leiopoda* Wedd. in Bull. Soc. Bot. France, 22: 177, 180 (1875). *Stylagrostis leiopoda* of the Catalogue. More or less rhizomatous, to 5 dm. tall. Leaf-sheaths glabrous, the ligule to 1.8 cm. long; blades involute, the apex pungent, much shorter than the inflorescence, glabrous, or scabridulous near the apex. Inflorescence golden-brown, oblong, to 6 cm. long, dense, the very short branches ascending, rachis, branches and pedicels mostly glabrous. Glumes to 7 (rarely 8) mm. long, acute or shortly bidentate at the apex, the midrib not prominent. Lemma stipitate below the callus, about 1-1.5 mm. shorter than the longer glume, 2-4-toothed; callus densely villous, the longest hairs 4-5 mm. long; rachilla to 1.5 mm. long, densely villous, the longest hairs to 5 mm. long; awn straight, 2-3 mm. long, shorter than the lemma, quickly deciduous, inserted about 1 mm. above the base of the lemma. LA PAZ: MURILLO: near La Paz, on the road to Coroico, 5000 m., *Mandon* 1319 (GH).

8. **C. ovata** (Presl) Steud. Nomencl. (ed. 2) 1: 254 (1840). *Deyeuxia nivalis* Wedd. in Bull. Soc. Bot. France, 22: 176, 180 (1875). *D. anthoxanthum* Wedd. in Bull. Soc. Bot. France, 22: 176, 180 (1875). *D. capitata* Wedd. in Bull. Soc. Bot. France, 22: 176, 180 (1875). *C. Pflanzii* Pilger in Engler, Bot. Jahrb. 49: 184 (1912). Caespitose, to 3 dm. high. Leaf-sheaths glabrous, the ligule to 1.5 cm. long; blades flat to subinvolute, much shorter than the inflorescence. Panicle golden-brown, to 6-7 cm. long, dense, ovate, the branches short, ascending, rachis and branches mostly glabrous, pedicels sparsely puberulous. Glumes to 1 cm. long (rarely longer), long-acute, the midrib moderately prominent, often scabridulous. Lemma about 4 mm. long, stipitate below the callus, rather deeply bidentate; callus densely villous, the longest hairs 3-4 mm. long; rachilla to nearly 1.5 mm. long, glabrous below, the apical hairs to 3 mm. long; awn straight, mostly exceeding the lemma by about 1 mm., inserted somewhat above the base of the lemma. LA PAZ: LARECAJA: vic. Sorata; Anilaya, 3800-4500 m., *Mandon* 1320 (GH); MURILLO: near La Paz, on the road to Coroico, 5000 m., *Mandon* 1318 (US; type-number of *Deyeuxia nivalis*); NOR YUNGAS: at top of La Cumbre, 4500 m., *Eyerdam* 25112 (GH).

9. **C. vicunarum** (Wedd.) Pilger in Engler, Bot. Jahrb. 42: 62 (1908). *C. pentapogonoides* O. Ktze. Rev. Gen. 3(2): 344 (1898). Plants 5-25 cm. tall, caespitose. Leaf-sheaths glabrous, the ligule to 2 mm. long; blades pungent, filiform, involute, curled or flexuose, shorter (usually) than the inflorescence, glabrous above, the margins



scabrid, puberulous to scabridulous beneath, ultimately glabrescent below. Inflorescence oblong, spicate in appearance, occasionally interrupted below, 2-3 cm. long, the very short branches ascending, appressed, rachis, branches and pedicels rather sparsely scabridulous. Spikelets to 7 mm. long. Glumes as long as the spikelet, long-acute, scabridulous, especially near the upper portion of the scabridulous keel. Lemma sessile below the callus, 2-3 mm. shorter than the glumes, with 3-4 slender apical teeth; callus sparsely-villous, the longest hairs about 0.5 mm. long; rachilla 0.5-0.75 mm. long, slightly villous, the longest hairs about 1 mm. long; awn geniculate, basally twisted, about 5-6 mm. long, inserted 1 mm. above the base of the lemma. LA PAZ: MURILLO: La Paz, 4100 m., *Buchtien* (GH). COCHABAMBA: CERCADO: Putuyuni, 4000 m., *Steinbach* 4086 (GH).

10. *C. cryptolopha* (Wedd.) Hitchc. in Contrib. U. S. Nat. Herb. 24: 374 (1927). To 8 dm. tall. Leaf-sheaths glabrous, the ligule 2-4 mm. long; blades mostly shorter than the inflorescence, nearly filiform, involute, scabridulous. Inflorescence narrow, dense, to 15 cm. long, sometimes interrupted below, the short (to 5 cm.) ascending branches appressed, rachis, branches and pedicels scabridulous. Glumes to about 6 mm. long, long-acute, scabridulous on and near the subprominent keel. Lemma sessile below the callus, about 1-1.5 mm. shorter than the glumes, shortly bidentate; callus rather sparsely villous, the longest hairs about 1 mm. long; rachilla about 1 mm. long, densely villous, the longest hairs about 2 mm. long; awn geniculate, the lower half loosely twisted, 4-5 mm. long, inserted about 1.5 mm. above the base of the lemma. LA PAZ: LARECAJA: Mt. Illampu, 3800 m., *Mandon* 1313 (GH; type-number).

11. *C. glacialis* (Wedd.) Hitchc. in Contrib. U. S. Nat. Herb. 24: 375 (1927). *Deyeuxia picta* Wedd. in Bull. Soc. Bot. France, 22: 177, 180 (1875). Height 3-5 dm. Leaf-sheaths scabridulous, ligule to 6 mm. long; blades shorter than or equaling the inflorescence, involute, stiff, scabridulous to glabrous. Inflorescence tawny-purple, to 20 cm. long, spicate in appearance, the rachis mostly glabrous, branches and pedicels sparingly scabrid on the angles. Glumes to 8 mm. long, acute to long-acute, glabrous to scabridulous, especially on the subprominent keel. Lemma to about 6 mm. long, sessile below the callus, deeply bidentate; callus rather sparsely villous, the longest hairs about 1 mm. long; rachilla about 2 mm. long, densely villous, the longest hairs about 4 mm. long, equaling the lemma; awn about 4 mm. long, straight, exceeding the lemma, inserted at or slightly below the middle of the lemma. LA PAZ: LARECAJA: vic. Sorata; Millipaya, 5000 m., *Mandon* 1312 (GH; type-number); MURILLO: Cerro de Huaina Potosí. *Germaan* 1 (US); Illimani, 4850 m., *Hitchcock* 22590 (GH).

12. *C. Jamesonii* Steud. Syn. Pl. Glum. 1: 191 (1854). Plant 7-33 cm. high, somewhat rhizomatous. Leaf-sheaths glabrous, the ligule to 2 mm. long; blades involute, shorter than or equaling the in-



florescence, obtuse to subacute, glabrous to puberulous. Inflorescence more or less ovoid, dense, 2-4 cm. long, occasionally somewhat interrupted below, the rachis, very short branches and pedicels villous to pubescent. Glumes to 6 mm. long, acute to subacute, glabrous to puberulent, the rather sharp keel pubescent-ciliate. Lemma sessile below the callus, about 4 mm. long, deeply bidentate, the teeth entire or toothed; callus very sparsely short-villous, the longest hairs less than 1 mm. long; rachilla 1.5 (-2) mm. long, densely long-villous, the longest hairs to 4 mm. long, equaling the lemma; awn straight, to 4 mm. long, much exceeding the lemma, inserted well below the middle of the lemma. LA PAZ: MURILLO: Chacaltaya, 4800 m., *Buchtien* 1193 (US).

This description is based on four topotypes, one of which is a probable isotype.

13. *C. curvula* (Wedd.) Pilger in Engler, Bot. Jahrb. 42: 60 (1908). *C. variegata* O. Ktze. Rev. Gen. 3(2): 354 (1898). Densely caespitose rhizomatous plants, to 3 dm. high. Leaf-sheaths glabrous, the ligule to 2 mm. long; blades involute, pungent, filiform, arcuate, scabridulous. Inflorescence spicate in appearance, oblong, to 4.5 cm. long (rarely to 7 cm.), the short branches ascending, rachis and branches glabrous, the pedicels glabrous to sparsely puberulent. Glumes to 5 mm. long, acute, glabrous, the keels scabridulous. Lemma sessile below the callus, about 3.5 mm. long, bidentate, the teeth broad and erosulous; callus villous, the longest hairs about 1 mm. long; rachilla about 2 mm. long or slightly longer, the longest hairs equaling or exceeding the lemma; awn straight to flexuose, but not geniculate, about 2 mm. long, equaling the lemma, inserted at the middle of the lemma or lower. POTOSÍ: SUR CHICHAS: Atocha, *Hitchcock* 22873 (GH).

14. *C. cephalantha* Pilger in Engler, Bot. Jahrb. 42: 61 (1908). *Deyeuxia Lagurus* Wedd. in Bull. Soc. Bot. France, 22: 176, 180 (1875). Dwarf caespitose plants, usually to 4 cm. high, occasionally to 15 cm. high. Leaf-sheaths glabrous, inflated, the ligule to 2.5 mm. long; blades involute, 8 mm. to 2 cm. long, pubescent. Inflorescence ovate, to 2.5 cm. long, the very short branches ascending, rachis, branches and pedicels puberulent-scabridulous. Glumes to about 6 mm. long, acute, glabrous to puberulous above. Lemma sessile below the callus, to 4.5 mm. long, the apex several-toothed; callus densely villous, the longest hairs to 1 mm. long; rachilla to 3 mm. long, densely villous, the longest hairs to 4 mm. long, much exceeding the lemma; awn geniculate, the lower half twisted, to 6.5 mm. long, inserted somewhat below the middle of the lemma. LA PAZ: MURILLO: Chacaltaya, 4800 m., *Buchtien* 1195 (US).

15. *C. curta* (Wedd.) Hitchc. in Contrib. U. S. Nat. Herb. 24: 376 (1927). Perennial, probably less than 10 cm. tall. Leaf-sheaths glabrous; blades glabrous, to 2.5 cm. long and less than 1 mm. wide,



flat or semi-involute, obtuse. Inflorescence a short, condensed, ovate panicle, less than 2 cm. long, the branchlets and pedicels puberulent. Glumes 6 mm. long, the midrib carinate and ciliate, upper portion of glumes scabridulous. Lemma nearly 4 mm. long, the apex with 4 short fine teeth; callus sparsely short-villous, the hairs about 0.5 mm. long; rachilla to nearly 2 mm. long, villous, the hairs about 1 mm. long; awn 4 mm. long, geniculate, inserted below the middle of the lemma and exceeding it. LA PAZ: LARECAJA: vic. Sorata, 4200 m., *Mandon* 1316 (US; type-number).

16. *C. brevifolia* (Presl) Steud. Nomencl. (ed. 2) 1: 240 (1840). Caespitose cushion-plants, the culms 2-4 dm. tall. Leaf-sheaths glabrous, the ligule to 2 mm. long; blades involute, filiform, arcuate or flexuose, pungent, scabridulous above, glabrous beneath, 2-10 cm. long. Inflorescence somewhat dense, oblong to oblong-ellipsoid, 3-7 cm. long, the short branches ascending-appressed or somewhat spreading at the base, the rachis usually glabrous, or sometimes sparsely puberulous or scabridulous, branches and pedicels glabrous to pubescent. Glumes to 7 mm. long, acute to subobtuse, the keel subprominent and scabridulous above. Lemma sessile below the callus, to 5 mm. long, the apex 3-4-toothed, the teeth short, delicate; callus densely villous, the longest hairs about 1 mm. long; rachilla to 3 mm. long, densely villous, the longest hairs to 4 mm. long, equaling or slightly exceeding the lemma; awn straight or flexuose, to 4 mm. long, slightly exceeding the lemma, inserted about 1.5-2 mm. above the base of the lemma. LA PAZ: MURILLO: La Paz, *Asplund* 6519 (Hitchcock).

17. *C. violacea* (Wedd.) Hack. ex Buchtien, Contrib. Fl. Bolivia, 1: 75 (1910). Caespitose, to 3 dm. tall. Leaf-sheaths puberulent-scabridulous, at least when young, the ligule acute, to 4 mm. long; blades filiform, involute, pungent, arcuate, scabridulous-puberulent, shorter than the inflorescence. Inflorescence rather open, to 6 cm. long, the branches 1.5-2.5 cm. long, rachis, branches and pedicels glabrous. Glumes to 6 mm. long, acute to shortly setaceous, purplish dorsally, the keel prominent and scabridulous above. Lemma about 0.5-1 mm. shorter than the glumes, sessile below the callus, with 3-4 short setaceous teeth at the apex; callus densely villous, the longest hairs to 2 mm. long; rachilla densely villous, the longest hairs 3 mm. long, equaling the lemma; awn straight or flexuose, about 4 mm. long, somewhat exceeding the lemma, inserted above the middle of the lemma. LA PAZ: OMASUYOS: near Achacache, 3950 m., *Mandon* 1307 (GH).

18. *C. tarmensis* Filger in Engler, Bot. Jahrb. 42: 70 (1908). *C. rosea* var. *macrochaeta* Hack, in Fries in Ark. Bot. 8: 40 (1908). Plants caespitose in dense tufts or fans, to 8 dm. tall. Leaf-sheaths glabrous, the truncate ligule 2-3 mm. long, erose; blades involute, filiform, flexuose to arcuate, stiffly coriaceous, scabridulous, shorter than to equaling the inflorescence. Panicle lax, 4-11 cm. long, narrow,



the branches ascending and appressed to somewhat spreading, rachis, branches and pedicels scabridulous to scabrid. Glumes 5-6 mm. long, acute, the keel prominent and scabridulous above. Lemma sessile below the callus, 4 (-5) mm. long, with 3-4 fine, short, apical teeth, sometimes scabridulous above; callus sparsely short-villous, the longest hairs about 0.8 mm. long; rachilla about 2 mm. long, rather sparsely villous, the longest hairs 1.5-2 mm. long; awn geniculate, the tightly twisted basal half not equaling nor exceeding the glumes, inserted about 1 mm. above the base of the lemma, at least 6 mm. long. COCHABAMBA: CERCADO: south side of Mt. Tunari, 3600 m., *Steinbach* 9783, 9785, 9788 (all GH).

19. *C. tarijensis* Pilger in Engler, Bot. Jahrb. 42: 71 (1908). Plants caespitose, to 9 dm. tall. Leaf-sheaths glabrous to scabridulous, the ligule to 2 mm. long, acute or subacute; blades involute, scabridulous. Panicle to 20 cm. long, lax, the branches to 5-6 cm. long, rachis, branches and pedicels scabridulous. Glumes about 5 mm. long, acute, the keel prominent and scabridulous above. Lemma sessile below the callus, about 4 mm. long, somewhat scabridulous above, with 4 short, slender, apical teeth; callus villous, the hairs to 1 mm. long; rachilla 1.5 mm. long, longest hairs to 1.5 mm.; awn geniculate, basal half twisted, equaling or exceeding the glumes, 6 mm. or more in length, inserted 1.5 mm. above the base of the lemma. COCHABAMBA: CERCADO: Mt. Tunari, 3600 m., *Steinbach* 9873 (GH). TARIJA: AVILES: Pinos, *Fiebrig* 3119 (GH).

20. *C. Fiebrigii* Pilger in Engler, Bot. Jahrb. 42: 68 (1908). Caespitose, to 3 dm. tall. Leaf-sheaths glabrous, the ligule to 4 mm. long, acute; blades involute, erect, finely scabridulous beneath. Inflorescence 4-6 cm. long, rather dense, the short branches ascending, appressed, rachis and branches glabrous to scabridulous, the pedicels hispidulous. Glumes to 6 mm. long, acute, the keel scabridulous. Lemma sessile below the callus, to 5 mm. long, acute, shortly bidentate; callus villous, longest hairs 1 mm. long; rachilla 2.5 mm. long, villous, the longest hairs 3 mm. long, nearly equaling the lemma; awn geniculate, to 7 mm. long, basal half tightly twisted, inserted about 1.5 mm. above the base of the lemma and much exceeding it. TARIJA: CERCADO: Calderillo, 3300 m., *Fiebrig* 3191 (US; type-number).

21. *C. Antoniana* (Griseb.) Steud. ex Hitchc. in Contrib. U. S. Nat. Herb. 24: 378 (1927). Caespitose, somewhat rhizomatous bunch-grass, to 6-8 dm. high. Leaf-sheaths usually glabrous, sometimes scabridulous, the ligule to 12 mm. long, acute; blades nearly as long as the inflorescence, involute, stiff, pungent, more or less scabridulous. Inflorescence narrow but rather lax, to 2 dm. long (but usually shorter?), the branches to 3-4 cm. long, ascending-appressed to somewhat spreading, rachis and branches mostly glabrous, the pedicels sparsely scabrid-puberulent, especially near the apex. Glumes to 7 mm. long, acute to subacuminate, the keel scabridulous. Lemma sessile below the callus,



about 5 mm. long, scabridulous, bidentate, the thin teeth shortly bidentate; callus villous, the longest hairs to 1 mm. long; rachilla 1-1.5 mm. long, villous, the longest hairs to 4 mm. long, distinctly exceeding the lemma; awn geniculate to flexuose, the basal portion loosely twisted, to 4-6 mm. long, much exceeding the lemma, inserted at or somewhat below its middle. LA PAZ: MURILLO: La Cumbre, *Asplund* 6514 (US).

22. *C. Orbignyana* (Wedd.) Hitchc. in *Contrib. U. S. Nat. Herb.* 24: 378 (1927). Caespitose, to 8 dm. tall. Leaf-sheaths glabrous, the ligule to 3 mm. long, acute to obtuse, emarginate to bidentate; blades filiform, involute, flexuose, much shorter than the inflorescence, scabridulous, the margins scabrid-ciliate. Inflorescence to 2 dm. long, narrow but lax, the branches to 4-5 cm. long, ascending to somewhat spreading, rachis and branches glabrous, the pedicels very sparsely scabrid to glabrous. Glumes about 5-6 mm. long, the keel scabridulous. Lemma sessile below the callus, 4-5 mm. long, very shortly 3-toothed; callus villous, the longest hairs 1.5 mm. long; rachilla 2 mm. long, villous, the longest hairs to 4 mm. long, equaling or slightly exceeding the lemma; awn about 4 mm. long, somewhat geniculate, the lower half loosely twisted, inserted at or below the middle of the lemma and somewhat exceeding it. LA PAZ: MURILLO: La Paz, 3750 m., *Buchtien* 180 (GH).

23. *C. intermedia* (Presl) Steud. *Nomencl.* (ed. 2) 1: 250 (1840). *C. Humboldtiana* of the Catalogue. *Deyeuxia gracilis* Wedd. in *Bull. Soc. Bot. France*, 22: 179 (1875). *D. Mandoniana* Wedd. in *Bull. Soc. Bot. France*, 22: 179, 180 (1875). Caespitose, rhizomatous, 3-10 dm. high. Leaf-sheaths finely scabridulous to glabrous, the ligule to 1 cm. long, apically narrowed and toothed; blades involute, stiff, coriaceous, usually about as long as the inflorescence, or at least reaching its base, scabridulous, pungent. Inflorescence to 30 cm. long, lax, the lowest branches sometimes to 8-10 cm. long, ascending-spreading, somewhat interrupted, the rachis mostly glabrous, branches and pedicels quite sparsely scabrid. Glumes to 7 mm. long, acute to acuminate, the keels apically scabridulous. Lemma sessile below the callus, to 6 mm. long, usually densely scabridulous-puberulous, bidentate, the slender teeth bidentate; callus villous, the longest hairs nearly 1 mm. long, rarely a little longer; rachilla 2-2.5 mm. long, villous, the longest hairs about 4 mm. long, equaling the lemma; awn geniculate, twisted, inserted well below the middle of the lemma and much exceeding it. LA PAZ: MURILLO: La Paz, 4100 m., *Buchtien* 123 (GH); Palca, 3800 m., *Buchtien* 122 (GH); LARECAJA: vic. Sorata; Velatulini, 3700 m., *Mandon* 1308 (GH; type-number of *Deyeuxia Mandoniana*).

24. *C. minima* (Pilger) Tovar in *Mem. Hist. Nat. Javier Prado*, no. 11: 52 (1960). Dwarf, pulvinate, to 6 cm. tall. Leaf-sheaths glabrous, the ligule less than 0.5 mm. long, apically truncate and



ciliate, blades to 1 cm. long, involute, the apex obtuse, margins scabrid-ciliate. Inflorescence to 1.5 cm. long, narrow, spicate in appearance, few-flowered, the rachis, branches and pedicels glabrous to sparsely scabridulous. Glumes to 5.5 mm. long, acute, the upper margins sometimes erosulous, the keel scabridulous above. Lemma sessile below the callus, about 4 mm. long, scabridulous above, with several very fine apical teeth; callus villous, the longest hairs less than 1 mm. long; rachilla about 0.5 mm. long, sparsely villous, the longest hairs to 1 mm. long; awn nearly 5 mm. long, geniculate, inserted about 0.5 mm. above the base of the lemma and much exceeding it. LA PAZ: MURILLO: La Paz, 4200 m., *Asplund* 6518 (US); La Cumbre, 4650 m., *Asplund* 6511 (US); Chacaltaya, 4800 m., *Buchtien* 1202 (US).

25. *C. trichophylla* Pilger in Engler, Bot. Jahrb. 42: 67 (1908). Caespitose, rhizomatous, to 5 dm. high. Leaf-sheaths glabrous, the ligule to 2.5 mm. long, subobtuse; blades involute, filiform, flexuose to straight, margins scabridulous, subacute to obtuse, shorter than the inflorescence. Inflorescence lax, open, narrow, to 9 cm. long, rachis, branches and pedicels sparsely scabrid. Glumes to 5 mm. long, acute, the keel scabridulous. Lemma sessile below the callus, about 3.5 mm. long, bidentate, the slender teeth bidentate; callus villous, the longest hairs about 1 mm. long; rachilla to 1.5 mm. long, sparsely villous, the longest hairs somewhat less than 1 mm. long; awn 4 mm. long, geniculate, inserted less than 1 mm. above the base of the lemma and exceeding it. COCHABAMBA: CHAPARE: 50 km. northeast of Cochabamba, on road to Chimoré, 1700 m., *Eyerdam* 25038 (GH).

26. *C. recta* (HBK.) Trin. ex Steud. Nomencl. (ed. 2) 1: 251 (1840). *Deyeuxia sulcata* Wedd. in Bull. Soc. Bot. France, 22: 178, 180 (1875). Bunch-grass, to 9 dm. high. Leaf-sheaths glabrous or scabridulous near the apex, ligule to 5 mm. long, truncate, the apex erose; blades involute, stiff, obtuse, nearly equaling or exceeding the inflorescence. Panicle to 25 cm. long, lax, interrupted, the lower branches to 7-8 cm. long, rachis, branches and pedicels scabrid to hispidulous. Glumes to 7 mm. long, acute, the prominent keel scabridulous. Lemma sessile below the callus, about 5 mm. long, bidentate; callus villous, the longest hairs somewhat less than 1 mm. long; rachilla to 2 mm. long, the longest hairs about 1.5 mm. long; awn geniculate, to 6-7 mm. long, inserted 1.5-2 mm. above the base of the lemma and much exceeding it. LA PAZ: LARECAJA: vic. Sorata; Puerta del Inca, 3700 m., *Mandon* 1308 bis (GH; type-number of *Deyeuxia sulcata*). COCHABAMBA: CERCADO: Cuesta Tabacruz, Tunari, 4500 m., *Steinbach* 9789 (GH).

27. *C. longiaristata* (Wedd.) Hack. in Sodiro in Anal. Univ. Quito, 1889: 8 (1998). *C. Beyrichiana* of the Catalogue. *C. montevidensis* var. *linearis* Hack. in Fedde, Rep. Sp. Nov. 6: 156 (1908). Plant to 8 dm. tall. Leaf-sheaths glabrous, the ligule to 4 mm. long, truncate, lacinate-dentate; blades flat, to 20 cm. long and 7 mm. wide, scabrid

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above and beneath. Inflorescence lax, open, to 2.5 dm. long, the lowest branches up to 15 cm. long, ascending-spreading to arcuate, rachis, branches and pedicels scabridulous. Glumes to 6 mm. long, very narrow, acute, the inconspicuous keel finely scabridulous. Lemma sessile below the callus, to 4.5 mm. long, acute, bidentate; callus densely villous, longest hairs as long as the lemma; rachilla nearly 2 mm. long, the lower portion glabrous, the apex sparsely villous with hairs 2.5-3 mm. long; awn to 9 mm. long, straight, divergent from the very base, inserted well above the middle of the lemma and far exceeding it. LA PAZ: NOR YUNGAS: Unduavi, *Buchtien* 8910 (US); SUR YUNGAS: Sirupaya, *Buchtien* 430 (US).

28. *C. densiflora* (Presl) Steud. Nomencl. (ed. 2) 1: 250 (1840). Caespitose, to 6 dm. tall. Leaf-sheaths glabrous, the ligule to 7 mm. long, subtruncate, erose-dentate; blades involute, acute to pungent, to 15 cm. long, scabridulous. Inflorescence to 18 cm. long, dense, the short ascending branches appressed, rachis, branches and pedicels scabridulous-puberulous. Glumes about 6 mm. long, acute, scabridulous on the upper portion and keel. Lemma sessile below the callus, almost as long as the glumes, somewhat scabridulous, bidentate; callus glabrous or with a very few hairs to 0.4 mm. long; rachilla about 2 mm. long, villous, the longest hairs 3 mm. long; awn straight, to 5 mm. long, inserted at or below the middle of the lemma and exceeding it. LA PAZ: MURILLO: Palca, *Pflanz* 296 (US).

The *Pflanz* specimen is without data except for the number. However, I have records for his nos. 295 and 297, which were collected at Palca. Thus, it seems probable that this is the locality for no. 296.

29. *C. polygama* (Griseb). Parodi in *Physis*, 9: 13, 14 (1928). *C. Lilloi* of the Catalogue. Caespitose, to 1-1.8 m. high. Leaf-sheaths glabrous, the ligule to 2.5 mm. long, acute to subobtuse; blades flat to folded, shorter than the inflorescence, scabridulous. Inflorescence a lax open panicle to 4 dm. long and 15 cm. wide, the spreading branches distant, rachis, branches and pedicels scabridulous. Glumes 3 mm. long, acute, scabridulous on the keel. Lemma sessile below the callus, as long as the glumes or a little longer, scabridulous, bidentate; callus villous, the longest hairs 0.8 mm. long; rachilla 1.5 mm. long, the longest hairs 1.5 mm. long, equaling the lemma; awn flexuose, about 2 mm. long, inserted shortly below the middle of the lemma and about equaling it. COCHABAMBA: CERCADO: west of Cochabamba, *Hitchcock* 22838 (GH); Vinto, 2500 m., *Parodi* 10234 (Parodi).

30. *C. viridiflavescens* (Poir.) Steud. Nomencl. (ed. 2) 1: 251 (1840). *C. montevidensis* of the Catalogue. Plant to 1 m. tall. Leaf-sheaths glabrous, ligule about 1 mm. long, deeply dissected-fimbriate; blades flat, to 7 mm. wide, usually much shorter than the inflorescence, scabridulous above and beneath. Inflorescence to 3 dm. long, loose, rather narrow, somewhat nutant, the lower branches sometimes to 10



cm. long, rachis and branches mostly glabrous, the pedicels scabridulous. Glumes to 4 mm. long, acute to acuminate, the keel scabridulous. Lemma sessile below the callus, about 3 mm. long, bidentate, the 2 teeth shortly fimbriate; callus densely villous, the longest hairs exceeding the lemma; rachilla about 1 mm. long, glabrous except for a very few hairs at the apex, hairs to 2.5 mm. long; awn divergent from the base, straight, about 6 mm. long, inserted above the middle of the lemma and much exceeding it. LA PAZ: SUR YUNGAS: San Felipe, 2800 m., *Hitchcock* 22601 (GH).

31. *C. spicigera* (Presl) Steud. Nomencl. (ed. 2) 1: 251 (1840). *Deyeuxia obtusata* Wedd. in Bull. Soc. Bot. France, 22: 177, 180 (1875). *D. subsimilis* Wedd. in Bull. Soc. Bot. France, 22: 178, 180 (1875). Stoloniferous, to 5 dm. tall. Leaf-sheaths glabrous, the ligule to 2 mm. long; blades involute, arcuate to flexuose, usually glabrous, occasionally puberulous, mostly shorter than the inflorescence. Inflorescence to 6 cm. long, dense, spicate in appearance, the short branches ascending, appressed, rachis glabrous to puberulent, branches and pedicels puberulent to hispidulous. Glumes to 8 mm. long, acute, the keel scabridulous. Lemma sessile below the callus, to 6.5 mm. long, bidentate, the 2 teeth bidentate; callus villous, the longest hairs to 2 mm. long; rachilla to 2.5 mm. long, villous, the longest hairs to 5 mm. long, equaling or slightly exceeding the lemma; awn geniculate, the basal portion twisted, inserted about 2 mm. above the base of the lemma and equaling or slightly exceeding it. LA PAZ: LARECAJA: vic. Sorata, *Mandon* 1311 (Tovar).

### 38. *Agrostis* L.

Perennials. Leaf-blades flat to involute. Inflorescence a terminal racemose panicle, from dense and spicate in appearance to lax and diffuse. Spikelets 1-flowered, disarticulation above the glumes. Glumes subequal, or, if unequal, the first longer than the second. Lemma hyaline, awned or awnless, much shorter than the glumes; palea present and obvious, or very minute, or absent.

- a. Panicle sometimes narrow, but open to diffuse, not spicate.
  - b. Panicle narrow, spikelets many.
    - c. Palea present, obvious.
      - d. Lemmas awned. .... 1. *A. gelida*.
      - d. Lemmas awnless. .... 2. *A. stolonifera*.
    - c. Palea absent or very minute. .... 8. *A. exasperata*.
  - b. Panicle open to diffuse, spikelets few.
    - e. Lemmas awnless. .... 5. *A. perennans*.
    - e. Lemmas awned.
      - f. Spikelets all long-pedicellate. .... 4. *A. montevidensis*.
      - f. Spikelets partly short-pedicellate, partly long-pedicellate. .... 6. *A. boliviana*.
- a. Panicle narrow, but not open nor diffuse, sometimes spicate.



g. Palea present. .... 3. *A. verticillata*.  
 g. Palea absent.

h. Panicle spicate; lemma 1.5 mm. long.

i. Panicle short (to 7 cm.), not interrupted. .... 7. *A. Haenkeana*.

i. Panicle long (to 15 cm.), interrupted, at least on the lower half. .... 10. *A. toluensis*.

h. Panicle narrow, loose; lemma 2 mm. long. .... 9. *A. araucana*.

1. *Agrostis gelida* Trin. in Mém. Acad. St. Pétersb. (ser. 6) Sci. Nat. 4(1): 343 (1841). Laxly caespitose, to 1 m. tall. Leaf-sheaths glabrous to scabridulous, ligule to 8 mm. long, abaxially pubescent; blades often long, flat, to 7-8 mm. wide, usually narrower, scabridulous beneath. Panicle narrow but lax, to 3 dm. long, the primary branches verticillate, bearing spikelets only from well above the middle, rachis mostly glabrous, branches and pedicels sparsely to densely scabridulous to scabrid. Glumes 3-4 mm. long, acuminate to subaristate, more or less sparsely scabridulous. Lemma to 2 mm. long, more or less truncately obtuse at the apex, the straight awn about 3 mm. long, inserted below the middle of the lemma and equaling or exceeding the glumes; palea nearly as long as the lemma, about 1.5 mm. LA PAZ: MURILLO: Pongo, *Hitchcock* 22781 (US).

2. *A. stolonifera* L. Sp. Pl. 62 (1753). Basally spreading, the culms to 5 dm. long. Leaf-sheaths glabrous, the ligule to 6 mm. long, glabrous; blades flat, to 3 mm. wide, scabridulous above and beneath. Panicle to 20 cm. long, rather open but narrow, the primary branches verticillate, rachis glabrous, the branches bearing spikelets nearly to the base, the branches and pedicels scabridulous to nearly glabrous. Glumes to 2-2.5 mm. long, acute, the keel scabridulous on the upper half. Lemma about 1.5 mm. long, acute to subobtuse, awnless (rarely awned); palea half as long as the lemma, obtuse. LA PAZ: MURILLO: Pongo, *Hitchcock* 22784 (US).

3. *A. verticillata* Vill. Prosp. Pl. Dauph. 16 (1779). Decumbent to spreading, sometimes stoloniferous, the culms to 5 dm. long (rarely up to 1 m.). Leaf-sheaths glabrous, the ligule 4-5 mm. long, abaxially short-scabrid, apically ciliate-fimbriate; blades mostly short, flat, to 7 mm. wide, scabrid above and beneath. Panicle dense, interrupted, to 15 cm. long, rachis glabrous, branches and pedicels mostly glabrous, occasionally sparsely scabridulous, the verticillate primary branches short, bearing spikelets to the base. Glumes about 2 mm. long, acute, scabridulous, the keel scabrid. Lemma awnless, about 1-1.5 mm. long, obtuse and toothed at the apex; palea as long, or nearly so. COCHABAMBA: CERCADO: Valle de Cochabamba, 2600 m., *Steinbach* 8773 (GH).

4. *A. montevidensis* Spreng. ex Nees, Agrost. Bras. 403 (1829). Slender, erect, culms to 2-3 dm. high. Leaf-sheaths glabrous, ligule to 4 mm. long, apically rounded, glabrous; blades short, flat, 1(-3)



mm. wide, scabridulous above and beneath. Panicle rather diffuse, rachis, branches and elongated pedicels variously scabridulous, primary branches verticillate and bearing spikelets only near the apex. Glumes 2-3 mm. long, acute, the keels scabrid. Lemma about 1.5 mm. long, the awn to 3.5 mm. long, geniculate, inserted nearly at the base of the lemma; palea absent. COCHABAMBA: CHAPARE: Llanta-Aduana, 2800-3200 m., *Steinbach* 8830 (GH, US); Cerro San Benito, 3400 m., *Steinbach* 9649 bis (GH).

5. *A. perennans* (Walt.) Tuckerm. in Amer. Journ. Sci. 45: 44 (1843). Decumbent to erect, the culms to 5-10 dm. high. Leaf-sheaths glabrous, ligule to 5 mm. long, glabrous, narrowed above, the apex obtuse and sparsely erose-dentate; blades relatively short, flat, to 3 mm. wide, scabridulous above and beneath. Panicle open, to 2 dm. long, rachis, branches and pedicels glabrous, the primary branches verticillate, rebranched, the spikelets borne at or near the apices on long pedicels. Glumes 2-3 mm. long, acute to acuminate, the keels sometimes scabridulous near the apex. Lemma 1.5-2 mm. long, bidentate, awnless or with a short awn (to 1.25 mm.) inserted at base of sinus between the teeth; palea absent or extremely minute. LA PAZ: MURILLO: Unduavi, 3200 m., *Buchtien* 2585 (GH); NOR YUNGAS: Bella Vista, *Hitchcock* 22757 (GH). COCHABAMBA: CHAPARE: Incachaca, 2250 m., *Steinbach* 9497 (GH); La Aduana, 2850-3000 m., *Steinbach* 9695 (GH).

6. *A. boliviana* Mez in Fedde, Rep. Sp. Nov. 18: 1 (1922). Somewhat lax, culms to nearly 6 dm. tall. Leaf-sheaths glabrous, the ligule to 6 mm. long, glabrous, apex bluntly rounded to deeply fimbriate; blades about 3 mm. wide, scabridulous above and beneath. Panicle open, to 18 cm. long, the rachis and branches glabrous, the pedicels sometimes sparsely scabridulous, the primary branches rebranched verticillately, the long-pedicellate spikelets borne toward the ends of the secondary branches. Glumes to 3.5 mm. long, acute, the keel finely scabridulous above. Lemma 2 mm. long, deeply bidentate, the flexuose to geniculate awn to 4.5 mm. long, inserted below the middle of the lemma; palea absent. TARIJA: CERCADO: Calderillo, 3200 m., *Fiebrig* 2905 (GH).

7. *A. Haenkeana* Hitchc. in Contrib. U. S. Nat. Herb. 24: 381 (1927). Caespitose, spreading to erect, the culms to 5 dm. tall, but usually much shorter. Leaf-sheaths glabrous, the ligule to 4 mm. long, rounded or fimbriate-dentate at the apex, glabrous; blades usually short, to 3 mm. wide, flat to involute, glabrous above and beneath. Panicle dense, spicate in appearance, to 7 cm. long, rachis, branches and pedicels glabrous, or the pedicels scabridulous, the short branches erect, appressed, bearing spikelets to the base (the lowest spikelets often aborted and reduced to pedicellate rudiments). Glumes to 3.5 mm. long, acute, somewhat scabridulous, the keel scabridulous above. Lemma 1.5 mm. long, the apex truncate and finely denticulate,



awned, the awn straight, flexuose or geniculate, to 2.5 mm. long, inserted above the middle of the lemma; palea absent or extremely minute. LA PAZ: LARECAJA: Puerto del Inca, 3800 m., *Mandon* 1292 (GH).

8. *A. exasperata* Trin. in Mém. Acad. St. Pétersb. (ser. 6) Sci. Nat. 4(1): 352 (1841). Erect to decumbent, the culms to 1 m. tall, usually shorter. Leaf-sheaths glabrous, the ligule to 5 mm. long, abaxially scabrid or scabridulous, the apex subobtuse to truncately acute, erose-dentate; blades flat, to 3-4 mm. wide, scabridulous above and beneath. Panicle rather dense, subpyramidal, to 15 cm. long, the rachis glabrous below, scabridulous above, the whorled primary branches and pedicels scabridulous to scabrid. Glumes mostly 3 mm. long, acute to long-acuminate and subaristate, densely scabridulous to scabrid, the keel markedly scabrid. Lemma to 1.5 mm. long, rather deeply bidentate, the straight awn to 2.5 mm. long, inserted at the middle of the lemma and equaling or very slightly exceeding the glumes; palea about 0.4 mm. long. LA PAZ: MURILLO: Palca, *Buchtien* 2531 (US).

9. *A. araucana* Phil. in Anal. Univ. Chile, 94: 14 (1896). Caespitose, to 5 dm. tall. Leaf-sheaths glabrous, the ligule to 4 mm. long, abaxially scabridulous, the apex truncate and dentate; blades flat to loosely involute, to 3 mm. wide, scabridulous above and beneath. Panicle narrow, to 15 cm. long, the rachis, ascending-appressed branches and pedicels scabridulous to scabrid, the long-pedicellate spikelets borne nearly to the base of the branches. Glumes to 3.5 mm. long, acute, glabrous or sometimes faintly scabridulous, the keel finely scabridulous. Lemma to nearly 2 mm. long, bidentate, the geniculate awn to 4 mm. long, inserted below the middle of the lemma and much exceeding the glumes; palea absent or very minute. LA PAZ: MURILLO: Unduavi, *Buchtien* 2581 (Hitchcock).

10. *A. toluensis* HBK. Nov. Gen. & Sp. 1: 135 (1816). Erect or spreading, to 6 dm. tall. Leaf-sheaths glabrous, the ligule to 5 mm. long, acute, glabrous; blades flat to involute, to 2 mm. wide, scabridulous above and beneath. Panicle narrow, to 15 cm. long, dense, interrupted below, more or less spicate in appearance, rachis and branches glabrous to scabridulous, the pedicels scabridulous. Glumes 2.5-3 mm. long, acute, glabrous to scantily scabridulous, the keel scabridulous. Lemma 1.5 mm. long, bidentate, the straight awn about 2.5 mm. long, inserted at or above the middle of the lemma and much exceeding the glumes (awns sometimes absent); palea absent. LA PAZ: SUR YUNGAS: San Felipe, 2800 m., *Hitchcock* 22600 (GH).

### 39. *Alopecurus* L.

See Parodi in Revist. Fac. Agron. Vet. Buenos Aires, 7: 345-369 (1931).



Erect or decumbent perennials or annuals, 50 cm. to 1 m. high. Leaf-blades flat, to 6 mm. wide, glabrous beneath, scabrid above, the uppermost sometimes equaling or slightly exceeding the inflorescence. Inflorescence a condensed panicle, spicate in appearance. Spikelets 1-flowered, strongly flattened, disarticulation below the equal glumes. Lemmas about as long as the glumes, awned; palea lacking.

Awns nearly 5 mm. long; inflorescence to 3 cm. long, nearly 1 cm. wide. .... 1. *A. bracteatus*.

Awns 1 mm. long; inflorescence about 5 cm. long, about 4 mm. wide. .... 2. *A. aequalis*.

1. ***Alopecurus bracteatus*** Phil. in Anal. Univ. Chile, **94**: 6 (1896). Perennial. Spikelets 3-4 mm. long. Glumes 3-4 mm. long, the keel long-ciliate, the hairs up to 1.5 mm. long, the 2 lateral veins silky-villous. Lemmas 3-3.5 mm. long, the upper margins ciliolate, otherwise glabrous, the awn inserted well below the middle of the lemma. LA PAZ: LARECAJA: vic. Sorata; Alto de Ticonguaya, 4100 m., *Mandon* 1244 (GH); MURILLO: La Paz, 3750 m., *Buchtien* 431 (GH), 502 (GH), 861 (GH); Pelaya, 4000 m., *Hitchcock* 22585 (GH).

2. ***A. aequalis*** Sobol. Fl. Petrop. 16 (1799). Annual. Spikelets about 2.5 mm. long. Glumes about 2 mm. long, the keel ciliolate but not densely long-silky. Lemmas 2.5 mm. long, the awn about 1 mm. long, hardly or not at all exerted from the glumes, inserted near the apex of the lemma. LA PAZ: MURILLO: vic. La Paz, 5000 m., *Mandon* 1243 (GH).

*Alopecurus Hitchcockii* L. R. Parodi in Revist. Fac. Agron. Vet. Buenos Aires, **7**: 366 (1931). Described as having the inflorescence 4 cm. long, 5-6 mm. wide. Spikelets 2.5 mm. long. Lemma-awn 1.5 mm. long, inserted at 1/3 the length of the lemma, not, or only very slightly, exceeding the glumes.

From the description, this seems unduly close to ***A. aequalis***. It probably should not be maintained as distinct.

#### 40. ***Polypogon*** Desf.

Perennial, in wet or damp habitats, to 1 m. high, leaf-blades flat. Inflorescence a narrow, dense, interrupted panicle, the 1-flowered spikelets disarticulating below the equal, awned glumes; lemma shorter than the glumes, thin-textured, usually awned, the awn inserted below the apex.

Glumes gradually attenuate into the awns, about 3 mm. long. ....

..... 1. *P. elongatus*.

Glumes abruptly obtuse, not narrowed into the awns, about 2 mm. long. .... 2. *P. interruptus*.

1. ***Polypogon elongatus*** HBK. Nov. Gen. & Sp. **1**: 134 (1816). Awns 1-1.5 mm. long, glumes scabrid-puberulent. Lemma 2 mm. long, the apex 2-4-toothed, the awn about 2 mm. long. LA PAZ: LARECAJA:



vic. Sorata, *Mandon* 1294 (GH); SUR YUNGAS: San Felipe, 2800 m., *Hitchcock* 22599 (GH).

2. *P. interruptus* HBK. No. Gen. & Sp. 1: 134 (1816). *P. lutosus* of the Catalogue. Awns 2.5-3 mm. long, glumes, especially the first, densely scabrid-puberulent. Lemma about 1 mm. long, apex toothed, awn about 2.5-3 mm. long. LA PAZ: MURILLO: cañon of Río de La Paz, 3355 m., *Shepard* 160 (GH); La Paz, 3300 m., *Rusby* 40 (GH), *Bang* 47 (GH), 3650 m., *Buchtien* 169 (GH), 238 (GH). COCHABAMBA: CERCADO: foothills of Mt. Tunari, 3400 m., *Steinbach* 9768 (GH); Valle de Cochabamba, *Steinbach* 8773 (GH), 8789 (GH); CHAPARE: Sacaba, 2900 m., *Steinbach s.m.* (GH); MIZQUE: Vilavila, 2600 m., *Eyerdam* 25321 (GH). POTOSÍ: CERCADO: Potosí, 4000 m., *Cárdenas* 206 (GH).

#### 41. *Lycurus* HBK.

*Lycurus phleoides* HBK. Nov. Gen. & Sp. 1: 142 (1816). Perennial, somewhat caespitose, to 3 dm. high. Leaves mostly basal, crowded, the sheaths puberulent to scabrid. the short flat blades scabridulous above and beneath, scabrid-ciliate. Inflorescence a terminal dense panicle, spicate in appearance, to 5 cm. long, the branchlets and pedicels scabridulous. Spikelets 1-flowered, paired, 1 spikelet perfect, the other staminate or sterile, the pair falling as a unit, disarticulation below the glumes. Glumes about equal, or the second longer than the first, 1.5-2 mm. long, 2-awned, the awns to 6 mm. long, the keels scabrid-ciliolate. Lemmas to 4 mm. long with a 3 mm. straight awn, 3-nerved, the margins villous-ciliate on the lower half. Palea as long as the lemma, villous on the keels. LA PAZ: MURILLO: Capi, *Bang* 762 (GH). COCHABAMBA: CERCADO: west of Cochabamba, *Hitchcock* 22822 (GH). POTOSÍ: CERCADO: Potosí, 4000 m., *Cárdenas* 204a (GH).

#### 42. *Muhlenbergia* Schreb.

See Parodi in *Physis*, 9: 205-222 (1928).

Annual or perennial, from dwarf plants a few centimeters high to about 1 m. high. Leaf-blades flat to involute. Inflorescence a racemose panicle, from dense and spicate to diffuse. Spikelets 1-flowered (2-3-flowered in one species), disarticulation above the awnless glumes. Lemma firm-textured, awned, the awn terminal, or very shortly cuspidate; palea similar to lemma and about as long, awnless.

- a. Second glume deeply tridentate. .... 1. *M. peruviana*.
- a. Second glume entire.
  - b. Panicle spicate in appearance. .... 7. *M. angustata*.
  - b. Panicle not spicate.
    - c. Panicle open to diffuse.
      - d. Lemma to 1.5 mm. long, awned, the awn to 5 mm. long. .... 3. *M. tenuissima*.



- d. Lemma to 2 mm. long, awnless, but shortly cuspidate. ....  
..... 4. *M. asperifolia*.
- c. Panicle narrow.
  - e. Lemma awnless.
    - f. Leaf-blades flat; rhizome absent. .... 5. *M. ligularis*.
    - f. Leaf-blades involute; slender scaly rhizome present. ....  
..... 6. *M. fastigiata*.
  - e. Lemma awned.
    - g. Awn over 1 cm. long.
      - h. Lemma 2.5-3 mm. long. .... 2. *M. quitensis*.
      - h. Lemma to 6-7 mm. long. .... 9. *M. rigida*.
    - g. Awn 3-4 mm. long. .... 8. *M. Holwayorum*.

1. ***Muhlenbergia peruviana*** (Beauv.) Steud. Nomencl. (ed. 2) 1: 41 (1840). *M. Herzogiana* Henrard in Meded. Rijks Herb. Leiden, no. 40: 58 (1921). Caespitose annual, 2-20 cm. high. Leaf-sheaths glabrous, ligule to 2 mm. long, acute to subobtuse; blades involute, very short, glabrous. Panicle to 2 cm. long, narrow, rather dense, rachis, branches and pedicels scabridulous. First glume entire, acute, to 1.5 mm. long; second glume to 2.25 mm. long, deeply tridentate. Lemma to 2.25 mm. long, scabridulous to pubescent, slightly bidentate, the straight or flexuose awn to 4 mm. long (rarely to 1.5 cm.); palea nearly as long as the lemma, sparsely pubescent. LA PAZ: MURILLO: La Paz, 4100 m., *Buchtien* 72 (GH). POTOSÍ: CERCADO: Potosí, 4000 m., *Cárdenas* 196 (GH); LINARES: Lagunillas, 3800 m., *Cárdenas* 483 in part (GH; originally entangled in a *Stevia*, no. 483). COCHABAMBA: CERCADO: Mt. Tunari, 3800 m., *Steinbach* 9849 (GH). TARIJA: CERCADO (?): Cuesta San Anaton, 3000 m., *Fiebrig* 3277 (GH).

2. ***M. quitensis*** (HBK.) Hitchc. in Contrib. U. S. Nat. Herb. 17: 292 (1913). Annual, 3-9 dm. high. Leaf-sheaths slightly scabridulous, the ligule to 4 mm. long; blades flat or involute, scabridulous, short (to 5 cm.), 2 mm. wide. Inflorescence narrow but loose, interrupted, to 2 dm. long, the primary branches bearing spikelets almost to the base. First glume to 2 mm. long, acute; second glume to 2.5-3 mm. long, entire, subulate-aristate. Lemma about 2.5-3 mm. long, subbidentate, the awn to 2 cm. long; palea pubescent at the base. Without locality: *Bang* 947 (Hitchcock).

3. ***M. tenuissima*** (Presl) Kunth, Rév. Gram. 1: suppl. XVI (1830). Delicate annual, to 2 dm. tall, occasionally taller. Leaf-sheaths glabrous to puberulous, the ligule to 2 mm. long, the apex rounded to subacute; blades short, flat, about 1 mm. wide, sparsely pubescent above and beneath, or almost glabrous. Panicle 10 cm. long, open, the primary branches apparently secund on occasion, rachis, branches and pedicels mostly glabrous. First glume to 1 mm. long, acute; second glume to 1.5 mm. long, long-acute or acuminate. Lemma (excluding awn) 1.5 mm. long, scabridulous, subbidentate, the straight awn to 5 mm. long; palea as long as lemma, somewhat puberulent at



base. LA PAZ: SUR YUNGAS: La Florida, 1840 m., *Hitchcock* 22622 (GH). COCHABAMBA: TARATA: Anzaldo, *Cárdenas* 2477 (GH).

4. *M. asperifolia* (Nees & Meyen) Parodi in *Physis*, 9: 210 (1928). Perennial, decumbent, to 4 dm. tall, with creeping rhizomes. Leaf-sheaths finely scabridulous to glabrous, the ligule 1-2 mm. long, apex rounded, ciliate or fimbriate-denticulate; blades short, flat, to 1.5 mm. wide, not falcate, scabridulous above and beneath. Panicle open, very diffuse, the primary branches rebranched, the branchlets bearing solitary long-pedicellate spikelets at the ends, branchlets and pedicels sparsely to rather densely scabridulous. Spikelets often 2-flowered, rarely 3-flowered, the florets distant on a glabrous rachilla. First glume to 1.75 mm. long, acute, somewhat scabridulous, especially on the keel; second glume to 2.25 mm. long, scabrid on the keel, the apex narrowly subtruncate, the midrib excurrent as a short scabridulous cusp. Lemma dark purple, at least in part, to 2 mm. long, slightly bidentate, the cusp less than 0.5 mm. long; palea as long as the lemma, bidentate, each tooth cuspidate. POTOSÍ: SUR CHICHAS: Oploca, *Hitchcock* 22891 (GH).

5. *M. ligularis* (Hack.) Hitchc. in *Contrib. U. S. Nat. Herb.* 24: 388 (1927). Decumbent tufted perennial, not rhizomatous, culms to 10 cm. high. Leaf-sheaths glabrous to finely papillate-scabridulous, the ligule to 4 mm. long, more or less acute; blades flat, to 2 mm. wide, rarely over 2 cm. long, finely papillate-scabridulous above and beneath. Panicle short, hardly 4 cm. long, narrow, few-branched, rachis, branches and short pedicels finely scabridulous. Glumes subequal, about 1 mm. long, the apex usually rounded, occasionally truncately subacute, the keel not prominent. Lemma to 2 mm. long, callus glabrous, finely scabridulous above, the midrib slightly excurrent as a cusp 0.2 mm. long; palea as long as the lemma. LA PAZ: MURILLO: vic. La Paz, 3300 m., *Bang* 109 (GH); LARECAJA: Millipaya, 3700 m., *Mandon* 1286 (GH).

6. *M. fastigiata* (Presl) Henrard in *Meded. Rijks Herb. Leiden*, no. 40: 59 (1921). Tufted creeping perennial, a few centimeters high, with spreading, slender, scaly rhizomes. Leaf-sheaths finely papillate, ligule about 1-1.5 mm. long, acute; blades involute, falcate, seldom over 1 cm. long, finely papillate. Panicle to 1 cm. long, narrow, few-flowered, rachis, branches and short pedicels finely papillate to scabridulous. Glumes subequal, slightly over 1 mm. long, acute, keel prominent, scabridulous. Lemma to 2.5 mm. long, acute, the apex with a cusp about 0.2-0.4 mm. long; palea about as long as the lemma, hardly cuspidate. LA PAZ: MURILLO: La Paz, 4100 m., *Buchtien* (GH). TARIJA: AVILES: Puna Patanca, 3700 m., *Fiebrig* 2633 (GH).

7. *M. angustata* (Presl) Kunth, *Rév. Gram.* 1: suppl. XVI (1830). Caespitose perennial, to 8 dm. tall. Leaf-sheaths scabridulous, the ligule to 1.1 cm. long, rounded to acute at the apex; blades long, folded to involute, densely scabridulous. Panicle dense, spicate in



appearance, to 15 cm. long, rachis, branches and short pedicels densely scabrid to densely short-hispid. Glumes equal or subequal, to 6-7 mm. long, acute, scabridulous. Lemma as long as the glumes, scabridulous, the straight awn to 3 mm. long; palea slightly shorter than the lemma, scabridulous, acute to subbidentate. LA PAZ: LARECAJA: near Millipaya, 3600 m., *Mandon* 1279 (GH). TARIJA: CERCADO: Calderillo, *Fiebrig* 3173 (GH).

8. *M. Holwayorum* Hitchc. in *Contrib. U. S. Nat. Herb.* 24: 389 (1927). Caespitose perennial to 6 dm. high. Leaf-sheaths glabrous, the ligule to 5 mm. long; blades flat to involute, to 3 mm. wide, scabridulous. Panicle narrow, to 2 dm. long, the rachis, appressed branches and pedicels scabridulous. Glumes subequal, about 1.5 mm. long, acute. Lemma to 3-4 mm. long, the awn to 3-4 mm. long; palea as long as the lemma. LA PAZ: LARECAJA: Sorata, *Holway & Holway* 530 (US; type).

9. *M. rigida* (HBK.) Kunth, *Rév. Gram.* 1: 63 (1829). *M. phragmitoides* of the Catalogue. Caespitose perennial, to 8 dm. tall. Leaf-sheaths finely puberulent to scabridulous, the ligule to 4 mm. long, apically dentate; blades firm, involute, scabridulous (at least above), acute. Panicle narrow, lax, not spicate in appearance, to 3 dm. long, the rachis, ascending branches and long pedicels scabridulous. Glumes subequal, to 2 mm. long, acute. Lemma to 6-7 mm. long, scabridulous, the awn to 1.5 cm. long; palea slightly shorter than the lemma. LA PAZ: MURILLO: Obrajes, 3350 m., *Buchtien* 819 (GH); LARECAJA: San Pedro, 2600-2700 m., *Mandon* 1280 (GH).

#### 43. *Triniochloa* Hitchc.

*Triniochloa stipoides* (HBK.) Hitchc. in *Contrib. U. S. Nat. Herb.* 17: 303 (1913). Perennial, to 1 m. high. Leaf-sheaths and blades puberulent, the blades very narrow and sometimes involute. Inflorescence a lax, few-flowered panicle, to 2 dm. long, the branches scabridulous. Spikelets 1-flowered, disarticulation above the glumes, to 1.2 cm. long (excluding the awn). Glumes equal, thin-textured, 2-3 mm. long, acute, 1-nerved, the keels scabridulous. Lemma nearly terete, rather indurate, to 1.2 cm. long, scabrid-puberulent on the upper portion, bidentate, the dorsal geniculate awn to nearly 2 cm. long, the lower half loosely twisted, the callus densely villous with hairs to 1.5 mm. long. Palea as long as the lemma and as firm-textured, deeply bidentate, the keels scabridulous. LA PAZ: NOR YUNGAS: Unduavi, 3800 m., *Buchtien* 4172 (GH).

#### 44. *Aciachne* Benth.

See Chase in *Journ. Wash. Acad. Sci.* 14: 364-366 (1924).

*Aciachne pulvinata* Benth. in *Hook. Ic. Pl.* 4: 44, t. 1362 (1881). Low-growing, less than 10 cm. high, densely caespitose perennial, in



wide-spread clumps. Leaf-blades involute, glabrous, falcate, pungent, about 1 cm. long. Inflorescence a single 1-flowered perfect spikelet, terminal on a solitary peduncle, hardly, or not at all, raised above the leaves, disarticulation above the glumes. Glumes equal, about 2 mm. long, more or less indurate, produced into a long, sharp awn-like point. Palea much shorter than the lemma and more or less enclosed by it, the rounded apex bifid. LA PAZ: LARECAJA: vic. Sorata; Chilcani, 3600-4200 m., *Mandon* 1287 (GH). COCHABAMBA: CHAPARE: Cumbre de San Benito, 3600 m., *Steinbach* 9888 (GH). Locality uncertain: *Fiebrig* 3571 (GH), *Bang* 1843 (GH).

#### 45. *Sporobolus* R. Br.

See Parodi in *Revist. Fac. Agron. Vet. Buenos Aires*, 6: 115-168 (1928).

Annual or perennial. Ligule obsolete, reduced to a semi-lunate line of hairs. Leaf-blades involute or flat. Inflorescence a panicle, open or spicate in appearance, often subpyramidal. Spikelets 1-flowered, disarticulation above the unequal glumes. Lemma and palea similar in appearance, the palea frequently splitting. Caryopsis turbinate-pyriform to oblong-ovoid, readily shed.

- a. Primary branches not in whorls.
  - b. Spikelets hardly 1 mm. long; panicle very open and diffuse. .... 1. *S. tenuissimus*.
  - b. Spikelets 2-3 mm. long.
    - c. Panicle narrow, spicate in appearance; spikelets to 3 mm. long. .... 4. *S. Poiretii*.
    - c. Panicle more open, not spicate; spikelets 2 mm. long, or less. .... 5. *S. indicus*.
- a. Primary panicle-branches in whorls.
  - d. Spikelets about 2 mm. long. .... 2. *S. argutus*.
  - d. Spikelets 3-4 mm. long. .... 3. *S. aeneus*.

1. *Sporobolus tenuissimus* (Mart. ex Schrank) O. Ktze. *Rev. Gen.* 3(2): 369 (1898). Annual, delicate, to 7 dm. high, glabrous, the culms compressed. Leaf-blades linear, to 3 mm. wide, sometimes equaling the inflorescence. Panicle to 3.5 dm. long, narrow, very open, the primary branches not whorled, branches ascending to spreading, pedicels delicate, long. Spikelets 1 mm. long, or less. First glume to 0.3 mm. long, narrowly linear; second glume 0.6 mm. long, narrowly deltoid. Lemma ovate to obovate, 1 mm. long or less, acute; palea as long, broader, the apex truncate to obtusely rounded. Caryopsis turbinate-pyriform, broadest at the apex or very near it. SANTA CRUZ: SARA: between the Río Cuchi and Río Piray, *Herzog* 1446 (Hitchcock).

2. *S. argutus* (Nees) Kunth, *Enum. Pl.* 1: 215 (1833). Spreading to suberect perennial, to 5 dm. tall. Leaf-sheaths glabrous; blades glabrous, the margins scabrid, linear, to 7-8 cm. long and 5 mm. wide,



flat to folded or subinvolute. Panicle to 10 cm. long, narrow, narrowly pyramidal at maturity, the primary branches in whorls, rachis, branches and pedicels glabrous. Spikelets about 2 mm. long. First glume 0.5 mm. long, oblong-ovate, subobtuse; second glume 1.75 mm. long, acute. Lemma 1.5 mm. long, acute; palea shorter and broader. Caryopsis oblong-ovoid, broadest at the middle. LA PAZ: MURILLO: La Paz, 3300 m., *Bang* 79 (GH).

3. *S. aeneus* (Trin.) Kunth, *Rév. Gram.* 1: suppl. XVII (1830). Densely caespitose perennial, to 6 dm. tall. Leaf-sheaths glabrous, the margins ciliate; blades long, narrow, folded or involute, pilose at the base on the adaxial surface, the margins ciliate. Panicle subpyramidal, narrow, to 3 dm. long, primary branches in distant whorls, floriferous nearly to the base, rachis, branches and pedicels glabrous. Spikelets 3-4 mm. long. First glume about 1.5 mm. long, lance-linear; second glume as long as the spikelet, 1-nerved. Lemma to 3-4 mm. long, lanceolate, acute, 3-nerved; palea as long as lemma. Caryopsis oblong-ovoid, broadest at the middle. LA PAZ: LARECAJA: Hacienda Casana, *Buchtien* 7147 (Hitchcock).

4. *S. Poiretii* (Roem. & Schult.) Hitchc. in *Bartonia*, 14: 32 (1932). *S. Berteroanus* of the Catalogue. Perennial, to 1 m. tall. Leaves glabrous, the blades sometimes equaling the inflorescence, flat below to involute above, to 5 mm. wide at the base. Inflorescence to 4 dm. long, usually much shorter, spicate in appearance, the primary branches not in whorls, rachis glabrous, branches and pedicels usually glabrous, sometimes sparsely scabridulous. Spikelets to 3 mm. long. First glume 0.5-1 mm. long, oblong-ovate, the apex truncate and erosulous; second glume 1.5 mm. long, acute, the upper margins erose. Lemma nearly 3 mm. long, acute to subobtuse; palea similar, but slightly shorter. Caryopsis turbinate-pyriform, broadest near or at the apex. LA PAZ: LARECAJA: Sorata, *Mandon* 1285 (GH); MURILLO: La Paz, 3700 m., *Buchtien* 179 (GH); NOR YUNGAS: Milluguaya, 1300 m., *Buchtien* 4187 (GH). COCHABAMBA: CHAPARE: Sacaba, 2900 m., *Steinbach* 8808 (GH); CERCADO: Mollemolle, 2800 m., *Steinbach* 4054 (GH). SANTA CRUZ: SARA: Buenavista, 500 m., *Steinbach* 5148 (GH).

5. *S. indicus* (L.) R. Br. *Prodr. Fl. Nov. Holl.* 1: 170 (1810). Perennial, to 8 dm. tall. Leaves glabrous, the blades chiefly involute, to 2 mm. wide at the base, shorter than the inflorescence. Panicle interrupted at the base, branches not whorled, moderately long and ascending to spreading, rachis, branches and pedicels glabrous to sparsely scabridulous. Spikelets 2 mm. long or less. First glume less than 0.5 mm. long, obtuse to truncate and erosulous; second glume somewhat less than 1 mm. long, acute or subacute. Lemma about 2 mm. long, acute; palea similar, usually somewhat shorter. SANTA CRUZ: ICHILO: Río Palometillas, 400 m., *Steinbach* 7933 (GH); SARA:



Buenavista, 450-500 m., *Steinbach* 6701 (GH), 6843 (GH), 6844 (GH), 6852 (GH), 6854 (GH).

*Sporobolus eximius* (Nees) Ekm. was included among the Bolivian species by Hitchcock, on the basis of a Fiebrig collection from Toldos. This locality is in Argentina. I have seen no Bolivian material of the species.

#### 46. *Nassella* (Trin.) E. Desv.

See Parodi in *Darwiniana*, 7: 369-395 (1947).

Perennials, often caespitose. Leaf-blades flat or convolute. Inflorescence a panicle, the 1-flowered spikelets disarticulating above the glumes. Glumes equal or unequal, rather thin, mostly hyaline. Lemma obliquely obovoid, gibbous toward the apex, often somewhat apiculate or mucronulate, enclosing the short membranous palea. Awn excentrically attached, caducous.

a. Glumes equal, or if unequal, not markedly so; lemma villous, callus villous.

b. Lower portion of awn villous; callus acute. .... 1. *N. Asplundii*.

b. Lower portion of awn scabrous; callus obtuse. .... 2. *N. pubiflora*.

a. Glumes markedly unequal; lemma glabrous or nearly so; callus glabrous or with a few short hairs. .... 3. *N. Meyeniana*.

1. *Nassella Asplundii* Hitchc. in *Contrib. U. S. Nat. Herb.* 24: 394 (1927). Caespitose, to 6 dm. tall. Leaf-sheaths glabrous or sparsely villous at the apex; blades involute, to 5 cm. long (occasionally longer). Panicle to 1.5 dm. long, open, the capillary branches naked below, axis and branches glabrous, pedicels scabrous-hirsutulous. Glumes to 4 mm. long, 3-nerved, the first glume ciliate on the keel. Lemma densely villous, 2.5 mm. long, the oblique apex unilaterally apiculate. Awn to 1.5 cm. long. POTOSÍ: Porco: Uyuni, 3500 m., *Asplund* 6548 (US; type).

2. *N. pubiflora* (Trin. & Rupr.) Desv. in *Gay, Fl. Chile*, 6: 264 (1853). *N. flaccidula* Hack. and *N. flaccidula* var. *humilior* Hack. in *Fedde, Rep. Sp. Nov.* 6: 155 (1908). *N. deltoidea* Hack. in *Fedde, Rep. Sp. Nov.* 11: 23 (1912). ? *Stipa tiraquensis* O. Ktze. *Rev. Gen.* 3(2): 373 (1898). *Stipa Pflanzii* Mez in *Fedde, Rep. Sp. Nov.* 17: 206 (1921). Caespitose, 5-9 dm. tall. Leaf-sheaths glabrous to scabrous; blades flat or subconvolute, glabrous, to 20 cm. long. Panicle to 2 dm. long, the lower branches naked on the basal third, axis scabridulous, branches and pedicels puberulent to shortly pubescent. Glumes 3.5-5 mm. long, 3-nerved, the first glume sparsely ciliate on the keel. Lemma villous, 2-2.4 mm. long, the obtuse callus villous; awn geniculate, to 1.5 cm. long, the base scabrous. LA PAZ: LARECAJA: vic. Sorata; Puquesani, 2700-3000 m., *Mandon* 1270 (GH); Catarguata, 3000 m., *Mandon* 1270 bis (GH; in part); MURILLO: La Paz, *Buchtien* 8541



(GH), 9309 (GH); Cerro del Calvario, 3800 m., *Buchtien* 145 (Hitchcock); Palca, 3700 m., *Hitchcock* 22579 (GH).

3. *N. Meyeniana* (Trin. & Rupr.) Parodi in *Darwiniana*, 7: 379 ((1947). *N. corniculata* Hack. in *Fedde, Rep. Sp. Nov.* 5: 155 (1908). Caespitose, to 6 dm. tall. Leaf-sheaths glabrous or somewhat pubescent at the apex; blades flat or subconvolute, to 20 cm. long, glabrous or dorsally pubescent. Panicle narrow, somewhat interrupted, to 25 cm. long, branchlets covered by spikelets to the base, axis and branchlets glabrous, the pedicels hispidulous on the angles. Glumes glabrous, markedly unequal, the first glume 4-4.5 mm. long, the second glume 3.5-4 mm. long. Lemma 1.8-2.2 mm. long, glabrous, shining, the obtuse callus glabrous or with a few short hairs, awn 1-1.5 cm. long, weakly or not at all geniculate. LA PAZ: MURILLO: La Paz, *Bang* 40 (GH); La Paz, 3700 m., *Buchtien* 366 (GH).

#### 47. *Piptochaetium* Presl

See Parodi in *Revist. Mus. La Plata (n. s.) Bot.* 6: 213-310 (1944).

*Piptochaetium panicoides* (Lam.) E. Desv. in *Gay, Fl. Chile*, 6: 270 (1853). *P. setifolium* and *P. tuberculatum* of the Catalogue. Caespitose perennial to 4 dm. tall. Leaves mostly basal, shorter than the inflorescence, the glabrous involute blades to 15 cm. long and 0.5 mm. wide. Inflorescence a terminal racemose panicle, to 1 dm. long, few-flowered, the rachis, branches and pedicels puberulent-scabridulous. Spikelets 1-flowered, disarticulation above the glumes. Glumes subequal, 3.5-4 mm. long, acuminate, several-nerved, glabrous. Lemma more or less D-shaped, to 2.5 mm. long, thick, firm-textured, surrounding the caryopsis and almost concealing the palea, finely striate, with a short apical collar strongly oblique at the summit, bearing a geniculate, loosely twisted excentric awn to 1 cm. long. Palea coriaceous, with 2 keels. (Department and province unknown): Alto de Cuchilla, 2600 m., *Troll* 839 (Parodi).

*P. panicoides* f. *subpapillosum* (Hack.) Parodi in *Revist. Mus. La Plata (n. s.) Bot.* 6: 302 (1944). A form with the lemma more or less papillose-tuberculate. LA PAZ: LARECAJA: vic. Sorata; Munaypata, 2650-2900 m., *Mandon* 1274 (GH).

#### 48. *Stipa* L.

See Hitchcock in *Contrib. U. S. Nat. Herb.* 24: 263-289 (1925).

Perennial. Leaf-blades mostly involute, sometimes flat. Inflorescence a panicle. Spikelets 1-flowered, disarticulation above the glumes; callus sharply pointed. Glumes hyaline-membranous. Lemma indurate, mostly fusiform, with a terminal twisted awn.

- a. Glumes unequal, the outer much longer than the inner.
- b. Longest glumes 1 cm. or more in length.
- c. Lemma with an apical crown.



- d. Lemma about 8 mm. long. .... 9. *S. Neesiana*.
- d. Lemma about 3 mm. long. .... 11. *S. depauperata*.
- c. Lemma without an apical crown. .... 18. *S. Holwayi*.
- b. Longest glumes to 7 mm. long. .... 3. *S. pampagrandsis*.
- a. Glumes equal or subequal, but the outer not much longer than the inner.
- e. Longest glumes about 1 cm. or more in length.
- f. Lemma with an apical crown.
  - g. Lemma 5-6 mm. long, villous below and nearly to apex; crown conspicuous, ciliate with short, thick, hispid hairs. .... 8. *S. mucronata*.
  - g. Lemma 4 mm. long, appressed-villous, crown short. .... 12. *S. brachyphylla*.
- f. Lemma without an apical crown.
  - h. Awn plumose on one segment.
    - i. Lemma to 9 mm. long; awn plumose on basal segment only. .... 1. *S. speciosa*.
    - i. Lemma to 5 mm. long; awn plumose on terminal segment only. .... 2. *S. plumosa*.
  - h. Awn not plumose, but sometimes pubescent or subvillous.
    - j. Lemma to 4 mm. long, villous, the apical hairs to 3 mm. long. .... 6. *S. nardoides*.
    - j. Lemma to 8 mm. long, sparsely villous, or glabrous, the apical hairs, if any, short. .... 14. *S. curviseta*.
- e. Longest glumes less than 1 cm. long; lemma lacking an apical crown.
- k. Awn straight or flexuose, but not geniculate.
  - l. Apex of lemma with a dense ring of hairs 3-4 mm. long; lemma fusiform or subfusiform.
    - m. Lemma glabrous or sparsely villous at base or apex. .... 7. *S. Hans-meyeri*.
    - m. Lemma sparsely pubescent or short-villous.
      - n. Lemma to 3 mm. long. .... 4. *S. Ichu*.
      - n. Lemma to 4-5 mm. long. .... 5. *S. capilliseta*.
  - l. Apex of lemma without a dense ring of hairs.
    - o. Lemma-apex broad, truncate; awn slightly excentric. .... 19. *S. florulenta*.
    - o. Lemma-apex attenuate, not truncate; awn not excentric.
      - p. Glumes acute; lemma glabrous above, sparsely pubescent below. .... 16. *S. polyclada*.
      - p. Glumes more or less obtuse; lemma glabrous, save for a few short hairs near apex. .... 15. *S. obtusa*.
- k. Awn geniculate.
  - q. Lemma obovoid, apex truncate. .... 10. *S. inconspicua*.
  - q. Lemma narrowly ellipsoid to fusiform, apex attenuate.
    - r. Lemma 3 mm. long, sparsely villous. .... 13. *S. dasycarpa*.



- r. Lemma at least 4 mm. long.  
 s. Plants to 2.5 dm. tall; lemma short-pilose. .... 17. *S. illimanica*.  
 s. Plants to 4-6 dm. tall; lemma sparsely short-pilose.  
 ..... 20. *S. Trollii*.

1. *Stipa speciosa* Trin. & Rupr. in Mém. Acad. St. Pétersb. (ser. 6) Sci. Nat. 5(1): 45 (1843). To 6 dm. tall, rigid, erect, the brown bases glabrous to pubescent. Leaves involute, acute to pungent, glabrous, or the margins loosely long-ciliate. Panicle rather dense, to 1 dm. long, the axis glabrous to scabrid to pubescent, the pedicels scabrid to pubescent and villous at the apex. Glumes thin, subequal or the outer shorter, long-acuminate, to 2.2 cm. long, 1-3-nerved, glabrous. Lemma to 9 mm. long, densely pubescent to villous. Awn to 6 cm. long, once-geniculate, twisted and plumose below the geniculation, glabrous above it. ORURO: POOPÓ: Pasña, *Buchtien* 1184 (US); PORCO: Uyuni, *Asplund* 6552 (US).

2. *S. plumosa* Trin. in Mém. Acad. St. Pétersb. (ser. 6) Sci. Nat. 4(2): 37 (1836). Erect to straggling, somewhat woody, to 2 m. tall, the base leafless or covered with old, glabrous to pubescent leaf-sheaths. Leaf-blades involute or subinvolute, long-ciliate, acute. Panicle somewhat lax, narrow, to 2 dm. long, the axis and branchlets mostly glabrous, pedicels glabrous to scabrid and short-pubescent on the angles. Glumes thin, papery, long-acuminate, 3-nerved, sparsely villous, usually on the midrib, to 1.2 cm. long. Lemma to 5 mm. long, pubescent to short-villous, glabrous near the apex and with an apical ring of sparse stiff hairs. Awn strongly geniculate or curved, to 4 cm. long, the basal section twisted and pubescent to short-villous, the upper section plumose. SANTA CRUZ: VALLEGRANDE: Comarapa, *Herzog* 1885 (US). POTOSÍ: PORCO: Uyuni, *Asplund* 6563 (US).

3. *S. pampagrandensis* Speg. in Anal. Mus. Nac. Montevideo, 4: 158 (1910). To 10 dm. tall, erect, glabrous. Leaf-blades involute. Panicle narrow, lax to 2 dm. long, somewhat exceeding or nearly equaled by the leaf-blades, axis glabrous, pedicels scabrid. Glumes unequal, the outer much longer than the inner, to 7 mm. long, long-attenuate to almost aristate, thin, 3-nerved. Lemma more or less obovoid, glabrous, irregularly rugulose or papillate-striate, to 3 mm. long. Awn to 5 cm. long, geniculate or strongly curved, the lower portion loosely twisted and scabridulous, the upper portion straight and glabrous to minutely scabridulous. TARIJA: CERCADO: Junaca, *Fries* 1308 (US).

4. *S. Ichu* (Ruíz & Pav.) Kunth, Rév. Gram. 1: 60 (1829). Caespitose, erect, glabrous, to 1.5 m. high. Leaf-blades involute, pungent. Panicle to 4 dm. long, lax, rather narrow, often silvery in color, the axis glabrous, branchlets and pedicels finely scabridulous. Glumes subequal or equal, thin, papery, long-acute, to 8 mm. long. Lemma fusiform, to 3 mm. long, sparsely pubescent, with a dense apical ring of hairs to 3-4 mm. long. Awn to 1.7 cm. long, scabridulous, not



geniculate but somewhat flexuose, the basal portion loosely twisted. LA PAZ: LARECAJA: Río Challasuyos between Lojena and Illampú, 2650-3800 m., *Mandon* 1273 (GH); MURILLO: La Paz, 3750 m., *Buch-tien* 185 (GH); Palca, *Hitchcock* 22581 (GH). POTOSÍ: CERCADO: Potosí, 4000 m., *Cárdenas* 199 (GH), 205 (GH). COCHABAMBA: CHAPARE: Cuchicanchi, 3300 m., *Steinbach* 9632 (GH).

5. *S. capilliseta* Hitchc. in Contrib. U. S. Nat. Herb. 24: 271 (1925). Caespitose, glabrous, to 5 dm. tall. Leaf-blades about equaling the base of the inflorescence, pungent, involute. Panicle narrow, to 15 cm. long, axis, branches and pedicels scabrid. Glumes subequal, to 7 mm. long, hyaline, papery, obscurely 3-nerved, scabridulous near base and along midrib, long-acute. Lemma 4-5 mm. long, fusiform, sparsely pubescent to short-villous, especially below, the apex with denser hairs to 4 mm. long. Awn to 2 cm. long, scabridulous, not geniculate but the lower portion loosely twisted. POTOSÍ: NOR LIPEZ: Chiguana, 3700 m., *Asplund* 6566 (US; type).

6. *S. nardoides* (R. A. Phil.) Hack. ex Hitchc. in Contrib. U. S. Nat. Herb. 24: 271 (1925). Densely caespitose, to 4 dm. high. Leaf-sheaths short-pubescent, short-villous at the apex; blades short, involute, obtuse to subpungent. Panicle narrow, to 1 dm. long, axis, branches and pedicels puberulent to scabridulous. Glumes subequal, glabrous, to 1 cm. long, long-acute, obscurely 3-nerved, purplish, the margins and apex white-hyaline. Lemma to 4 mm. long, terete or subfusiform, densely short-villous, the longer apical hairs to 3 mm. long. Awn to 2 cm. long, geniculate, basal portion tightly twisted, somewhat puberulous, upper portion shortly puberulous. ORURO: PORCO: Uyuni, *Asplund* 6539 (US).

7. *S. Hans-meyeri* Pilger in Engler, Bot Jahrb. 56, Beibl. 123: 24 (1920). Caespitose, glabrous, to 5 dm. tall. Leaf-blades involute, pungent. Panicle dense, to 10 (-20) cm. long, purple or brownish-purple, axis, branches and pedicels scabridulous. Glumes equal or subequal, to 7 mm. long, long-acute, glabrous. Lemma subfusiform, to 3.5 mm. long, sparsely villous at base and apex, the apical ring of hairs dense and to 3 mm. long. Awn about 1 cm. long, curved but not strongly geniculate, the base puberulent, the upper portion finely scabridulous. LA PAZ: LARECAJA: inter Millipaya et Velatutini, 3700 m., *Mandon* 1272 bis (GH).

8. *S. mucronata* HBK. Nov. Gen. & Sp. 1: 225 (1816). Caespitose, to 10 dm. tall, erect or geniculate, mostly glabrous. Leaf-blades often about equaling the inflorescence, flat or somewhat folded, sparsely scabrid beneath, the margins coarsely ciliate. Panicle to 3 dm. long, lax, the axis glabrous, branches and pedicels somewhat puberulent-scabridulous. Glumes subequal, or the outer slightly longer, about 1 cm. long, long-acute, the midrib and margins often coarsely and sparsely hispid-ciliate. Lemma to 5-6 mm. long, subfusiform, villous below and nearly to the summit, the apex developed into a crown



terminated by short stiff hairs. Awn to 3 cm. long, twice bent, the lowest portion tightly twisted and pubescent, the central portion loosely twisted and scabridulous, the terminal portion straight and only minutely scabridulous. LA PAZ: MURILLO: La Paz, 3750 m., *Buchtien* 3692 (GH), 430 (GH); LARECAJA: vic. Sorata, 2600-2700 m., *Mandon* 1276 (GH). COCHABAMBA: CERCADO: Mollemolle, 2800 m., *Steinbach* 4056 (GH).

9. *S. Neesiana* Trin. & Rupr. in Mém. Acad. St. Pétersb. (ser. 6) Sci. Nat. 5(1):27 (1843). To 10 dm. tall, caespitose, mostly glabrous, the nodes usually pubescent to villous. Leaf-blades flat to folded, scabridulous beneath, the margins hispid-ciliate. Panicle to 2 dm. long, axis glabrous, branches and pedicels scabridulous to hispidulous. Glumes somewhat unequal, the outer longer, to 1.5 cm. long, long-acute, the midribs often hispid. Lemma to 8 mm. long, pubescent to villous below, the upper portion glabrous, smooth to papillate-rugose, the apical crown often long. Awn twice-bent or twice-geniculate, to 1.5 cm. long, the lowest portion tightly twisted and pubescent, the central portion loosely twisted and puberulent, the terminal portion straight and puberulent to scabridulous. LA PAZ: LARECAJA: Sorata, *Rusby* 237 (US). COCHABAMBA: CERCADO: Cochabamba, *Holway* 328 (US).

Extreme forms of *S. Neesiana* and *S. mucronata* appear quite distinct, but enough intergradation occurs to make their specific distinctness appear somewhat questionable.

10. *S. inconspicua* Presl, Rel. Haenk. 1: 277 (1830). *Nassella flacidula* Hack. in Fedde, Rep. Sp. Nov. 6: 154 (1908). Caespitose, to 4.5 dm. tall, glabrous. Leaf-blades flat or involute, the uppermost equaling or exceeding the inflorescence. Panicle to 10 cm. (occasionally to 18 cm.), narrow, the branches quite distant, axis and branches glabrous, branchlets and pedicels puberulent to scabridulous. Glumes subequal or the outer slightly longer, acute, several-veined, about 3.5 mm. long. Lemma more or less obovoid, 2.5-3 mm. long, sparsely pubescent. Awn to 1.5 cm. long, once-geniculate, scabridulous, the lower portion twisted, the upper portion straight. LA PAZ: MURILLO: La Paz, *Holway* 600 (US).

11. *S. depauperata* Pilger in Engler, Bot. Jahrb. 56, Beibl. 123: 23 (1920). Caespitose, spreading, to 5 dm. tall, mostly glabrous. Leaves short, the involute blades rarely equaling the base of the inflorescence. Panicle narrow, to 15 cm. long, brownish to purplish, axis glabrous, branchlets and pedicels from glabrous to pubescent. Glumes unequal, to 1 cm. long, long-acute, the midribs minutely scabridulous, otherwise glabrous. Lemma fusiform, to 3 mm. long, pubescent (sometimes sparsely so), the apical crown quite short. Awn to 1.5 cm. long, geniculate, the lower portion tightly twisted and short-pubescent, the upper portion straight and puberulent to scabridulous. LA PAZ: MURILLO: La Paz, *Holway* 492 (US).



12. *S. brachyphylla* Hitchc. in Contrib. U. S. Nat. Herb. 24: 275 (1925). Caespitose, to 4 dm. tall, glabrous. Leaves short, the blades involute, pungent, upper surface scabrid. Panicle lax, narrow, to 1 dm. long, axis and branches glabrous, branchlets and pedicels puberulent to short-hispid. Glumes somewhat unequal or subequal, to 1 cm. long, acute or acuminate, the midrib of outer glume often sparsely appressed-hispid. Lemma fusiform, about 4 mm. long, or a little longer, appressed-villous, the apical crown short. Awn to 2.5 cm. long, twice-geniculate, lowest portion tightly twisted and pubescent, central portion more loosely twisted and puberulent, upper portion straight, minutely puberulent to scabridulous. LA PAZ: MURILLO: La Paz, *Holway* 433 (US); OMASUYOS: Yumari, 3850 m., *Asplund* 6557 (US).

13. *S. dasycarpa* Hitchc. in Contrib. U. S. Nat. Herb. 24: 281 (1925). To 3-4 dm. tall. Leaf-blades involute, glabrous on the lower surface, puberulous on the upper surface. Panicle rather lax, to 1.5 dm. long. Glumes equal, 5 mm. long, acuminate. Lemma about 3 mm. long, fusiform, sparsely villous, apical crown lacking, callus 0.5 mm. long. Awn 2 cm. long, twice-geniculate, the lower 2 segments appressed-villous. POTOSÍ: NOR LIPEZ: Chiguana, *Asplund* 6562 (Hitchcock).

14. *S. curviseta* Hitchc. in Contrib. U. S. Nat. Herb. 24: 282 (1925). Caespitose, to 5 dm. tall. Leaf-blades involute, glabrous or scabridulous beneath, pubescent above. Panicle lax, to 2 dm. long, axis glabrous, branches and pedicels pubescent to scabrid. Glumes subequal, to 1.5 cm. long, long-acuminate. Lemma terete, to 8 mm. long, sparsely villous to glabrate, apical crown obscure, ciliate, callus to 3.5 mm. long. Awn to 7 cm. long, twice-geniculate, the lowest portion twisted and villous, the terminal segment flexuose, decreasingly villous toward the end. POTOSÍ: PORCO: Uyuni, 3700 m., *Asplund* 6551 (US; type); SUR CHICHAS: Atocha, 3700 m., *Asplund* 6550 (US), 6547 (US); NOR LIPEZ: Chiguana, 3700 m., *Asplund* 6554 (US).

15. *S. obtusa* (Nees & Mey.) Hitchc. in Contrib. U. S. Nat. Herb. 24: 284 (1925). *S. boliviensis* Pilger in Engler, Bot. Jahrb. 56: 26 (1920). Caespitose, to 4 dm. high, glabrous. Leaf-blades involute, pungent, scabridulous, some equaling or exceeding the inflorescence-base. Panicle narrow, to 15 cm. long, axis, branches and pedicels scabridulous. Glumes equal or subequal, about 3 mm. long, broadly ovate, abruptly short-acute or subobtuse, the second glume often subtridentate. Lemma narrowly elliptic-fusiform, to 3 mm. long, glabrous save for a few short sparse hairs at or near the apex. Awn to 1 cm. long, not geniculate, not twisted, scabrid to scabridulous. LA PAZ: MURILLO: La Paz, 4100 m., *Buchtien* 184 (GH). COCHABAMBA: CERCADO: south side of Mt. Tunari, 3600 m., *Steinbach* 9786 (GH).

16. *S. polyclada* Hack. ex Stuck. in Anal. Mus. Nac. Buenos Aires, 21: 80 (1911). Straggling, the branches fasciated at the nodes. Leaf-blades involute to flat, pungent, short. Panicle lax, to 1 dm. long,



axis and branches glabrous (sometimes scabridulous), pedicels puberulent to scabridulous. Glumes hyaline, about 3 mm. long, acute, subequal. Lemma to 2.5 mm. long, narrowly ellipsoid, glabrous above, sparsely appressed-pubescent below, the apex attenuate. Awn to 2.5 cm. long, variously bent but not geniculate, scabridulous.

I have seen no Bolivian material on this species. In his treatment of the Andean grasses (1927) and his synopsis of South American *Stipa* (1925), Hitchcock cited *Asplund* 6563 as the basis for the inclusion of Bolivia in the range. The sheet of this number at Washington seems to me to be *Stipa plumosa*. Consequently, the occurrence of *Stipa polyclada* in Bolivia is problematical.

17. *S. illimanica* Hack. in Fedde, Rep. Sp. Nov. 11: 22 (1912). Caespitose, to 2.5 dm. tall. Leaf-blades flat or loosely involute, the margins scabrid. Panicle narrow, to 1.4 dm. long, axis glabrous. Glumes subequal, to 6 mm long, acute, 3-nerved. Lemma to 4-4.5 mm. long, short-pilose, the apex scabrid, apical crown lacking, callus short (0.5 mm.), pubescent. Awn to 3 cm. long, geniculate, the base loosely twisted and pubescent, the terminal portion puberulent to scabrid. LA PAZ: MURILLO: Cotaña, 2450 m., *Buchtien* 3134 (US; type-number).

18. *S. Holwayi* Hitchc. in Contrib. U. S. Nat. Herb. 24: 287 (1925). To 1 m. tall. Leaf-blades flat or involute, narrow, glabrous beneath, short-pubescent on upper surface. Inflorescence a narrow, lax panicle to 2.5 dm. long, axis glabrous, branches and pedicels shortly puberulous to hispid, especially near the apex of panicle. Glumes to 1.1 cm. long, unequal, the outer 1.5 mm. longer than the inner, 3-nerved, acuminate. Lemma to 5-6 mm. long, the callus to 1 or 1.5 mm. long and densely pubescent, fusiform, villous, the apex with an obscure crown. Awn to 4.5 cm. long, twice-geniculate, the 2 lower portions twisted and scabrid-pubescent, the terminal portion to 2-3 cm. long, flexuose, glabrous to scabridulous. ORURO: ABAROA: Challapata, 2900 m., *Asplund* 6546 (US). COCHABAMBA: CERCADO: Cochabamba, *Holway* 380 (US; type).

19. *S. florulenta* (Pilger) Parodi in Rev. Mus. La Plata (n. s.) Bot. 6: 307 (1944). *Oryzopsis florulenta* of the Catalogue. To 1 m. tall. Leaf-blades flat or somewhat involute, scabridulous. Panicle lax, to 2.5 dm. long (sometimes to 4 dm. ?), axis more or less glabrous, branches and pedicels hispid-scabridulous. Glumes subequal, to 4 mm. long, acute to acuminate, 3-nerved. Lemma about 3-4 mm. long, obovoid, apex broad and truncate without a crown or ciliation, sparsely pilose to almost glabrous. Awn to 2 cm. long, not geniculate, the scabridulous base somewhat loosely twisted, the remainder somewhat flexuose or straight. LA PAZ: LARECAJA: Catarguata, 3000 m., *Mandon* 1270 bis (GH; mixed with *Nassella pubiflora*).

20. *S. Trollii* Pilger in Notizbl. 11: 777 (1933). To 4-6 dm. tall. Leaf-blades somewhat involute, the upper surface scabridulous.



Panicle to 1.2 dm. long, the axis glabrous. Glumes 5-6 mm. long, lanceolate, the midrib somewhat excurrent. Lemma 4 mm. long, sparsely short-pilose. Awn to 1.5 cm. long, once-geniculate, glabrous. POTOSÍ: PORCO: Salasala-Tasnopalco, 3400 m., *Troll* 3374.

No material of this species has been seen. This description is adapted from the original description.

#### 49. *Aristida* L.

See Caro in Kurtziana, 1: 123-206 (1961).

Annual or perennial. Leaf-blades flat or involute. Inflorescence a compact to lax panicle. Spikelets 1-flowered, disarticulation above the glumes, the callus sharply pointed. Glumes unequal to equal or subequal. Lemma terete to fusiform, with 3 apical awns, these free to the base or nearly so, or basally united in a short or long twisted column.

- a. Callus bidentate at tip. .... 4. *A. riparia*.
- a. Callus entire.
  - b. Glumes subequal or equal, or the outer longer than the inner.
    - c. Glumes very unequal, the outer about twice the length of the inner. .... 5. *A. mendocina*.
    - c. Glumes subequal or equal.
      - d. Leaf-blades involute. .... 6. *A. enodis*.
      - d. Leaf-blades flat (at least at base). .... 7. *A. circinalis*.
  - b. Glumes unequal, the outer shorter than the inner.
    - e. Lemma to 3 mm. long. .... 1. *A. capillacea*.
    - e. Lemma to 8-10 mm. long.
      - f. Lemma-awns united in a column 2-3 cm. long. .... 3. *A. implexa*.
      - f. Lemma-awns not united in a column.
        - g. Longest glumes to 7 mm. long. .... 2. *A. adscensionis*.
        - g. Longest glumes to 1.5 cm. long. .... 8. *A. laevis*.

1. *Aristida capillacea* Lam. Tabl. Encycl. 1: 156 (1791). *A. Mandoniana* Henr. in Meded. Rijks Herb. Leiden, no. 40: 55 (1921). Annual to 2 dm. high. Leaf-blades narrow, somewhat involute, scabridulous on upper surface, with a few scattered long hairs near the base. Panicle narrow but rather lax, to 8-10 cm. long, axis and branches glabrous, pedicels glabrous to puberulent. Glumes unequal, the outer shorter, to 4 mm. long, acute, glabrous, the prominent midrib scabridulous. Lemma to 3 mm. long. Awns united basally in a puberulent column, the free portions to 4-5 mm. long, puberulent to scabridulous. LA PAZ: SUR YUNGAS: Guanai, 1600 m., *Rusby* 208 (GH). SANTA CRUZ: SARA: Buenavista, 500 m., *Steinbach* 6140 (GH).

2. *A. adscensionis* L. Sp. Pl. 82 (1753). Caespitose annual, glabrous, the culms branching from the lower nodes, to 3 dm. tall. Leaf-blades involute. Panicle to 1.5 dm. long, compact to spreading, axis, branches



and pedicels usually scabridulous. Glumes unequal, the outer shorter, to 7 mm. long, acute, the midrib scabrous. Lemma to 8 mm. long, the apex long-attenuate, the upper portion puberulent-scabrid. Awns not united basally into a column, to 2 cm. long, the central awn exceeding the laterals, markedly scabrous. COCHABAMBA: CERCADO: Cochabamba, *Hitchcock* 22817 (GH). POTOSÍ: SUR CHICHAS: Villazón, 3500 m., *West* 6368 (GH). LA PAZ: MURILLO: Cotaña, 2450 m., *Buchtien* 208 (GH); Obrajés, 3300 m., *Buchtien* 140 (GH).

3. *A. implexa* Trin. in *Mém. Acad. St. Pétersb.* VI, *Sci. Nat.* 2(1): 48 (1836). Perennial, to 6 dm. tall. Leaf-blades flat or involute, the upper surface densely pilose near the base. Panicle to 2 dm. long, axis, branches and pedicels scabrid. Glumes unequal, the outer much shorter, to 2 cm. long, scabridulous, long-acute. Lemma to 8 mm. long, glabrous, the apex attenuate. Awns united basally into a twisted column to 2-3 cm. long, the free portions to 3-5 cm. long, the central awn longer than the laterals, scabridulous. SANTA CRUZ: SARA: Buenavista, *Steinbach* 5352 (GH), 7029 (GH).

4. *A. riparia* Trin. in *Mém. Acad. St. Pétersb.* VI, *Sci. Nat.* 2(1): 48 (1836). Perennial, caespitose, to 8 dm. high. Leaf-blades flat or involute, rather thick. Panicle to 1.5 dm. long, axis, branches and pedicels scabridulous. Glumes unequal or subequal, the outer longer, awned, to 1.4 cm. long (including the awn), scabridulous, the midrib of the outer glumes prominently so. Lemma to 6 mm. long, glabrous, the callus bidentate at the tip. Awns united basally in a twisted column to 1 cm. long, the free portions equal, to 2 cm. long, scabridulous. LA PAZ: SUR YUNGAS: Chulumani, 1600 m., *Hitchcock* 22702 (GH).

5. *A. mendocina* R. A. Phil. in *Anal. Univ. Chile*, 36: 205 (1870). *A. inversa* Hack. in *Fries in Ark. Bot.* 8(8): 37 (1908). Perennial, caespitose, to 6 dm. high. Leaf-blades somewhat involute, scabridulous on the upper surface. Panicle lax, narrow, to 2 dm. long, axis, branches and pedicels scabridulous. Glumes very unequal, the first to 11 mm. long, midrib scabrid, the second to 5 mm. long, scabridulous, both glumes often shortly mucronate. Lemma terete to fusiform, somewhat scabridulous on the upper portion, to 9 mm. long. Awns free to the base or nearly so, the central awn to 3 cm. long, the laterals slightly shorter, scabridulous. SANTA CRUZ: SARA: Buenavista, *Steinbach* 1927 (GH).

I have followed Hitchcock in uniting *A. mendocina* and *A. inversa*, but Caro has shown some differences which may warrant at least varietal segregation.

6. *A. enodis* Hack. in *Fedde, Rep. Sp. Nov.* 11: 21 (1912). *A. Pflanzii* Mez in *Fedde, Rep. Sp. Nov.* 17: 151 (1921). ? *A. Asplundii* Henr. in *Meded. Rijks Herb. Leiden*, no 54: 42 (1926). Perennial, caespitose, to 4 (-5) dm. tall. Leaf-blades involute, often somewhat scabridulous. Panicle rather dense, often purple, to 10 cm. long.



Glumes equal or subequal, to 1 cm. long. scabrid to nearly glabrous, the scabrid midrib excurrent as a mucro. Lemma narrowly fusiform, to 1 cm. long, glabrous. Awns distinct to the base, to 3 cm. long, minutely scabridulous. LA PAZ: LARECAJA: prope Munaypata, 2700 m., *Mandon* 1277 (GH). SANTA CRUZ: SARA: Buenavista, 400 m., *Steinbach* 6807 (GH).

7. *A. circinalis* Lindm. in Sv. Vet. Akad. Handl. 34(6): 13 (1900). ? *A. Friesii* Henr. in Meded. Rijks Herb. Leiden, no. 54: 186 (1926). Perennial, caespitose, to 8 dm. tall. Leaf-blades long, flat near the base, becoming involute-filiform, glabrous. Panicle to 2 dm. long, axis, branches and pedicels usually glabrous. Glumes subequal or the outer longer, to 8 mm. long, glabrous, acute, or the midrib excurrent as a mucro. Lemma fusiform, to 7 mm. long, glabrous. Awns subequal, free to base, to 3 cm. long, minutely scabridulous. LA PAZ: SUR YUNGAS: Chulumani, *Hitchcock* 22711 (US).

8. *A. laevis* (Nees) Kunth, Enum. Pl. 1: 192 (1833). *A. complanata* of the Catalogue. *A. longiramea* var. *boliviana* Henr. in Meded. Rijks Herb. Leiden, no. 40: 56 (1921). Perennial, caespitose, to 7 dm. high. Leaf-blades flat, somewhat scabridulous. Panicle narrow, to 2.5 dm. long; axis, branches and pedicels scabridulous to scabrid. Glumes equal or subequal, the outer shorter, to 1.5 cm. long, aristate or mucronate, the midrib scabrid. Lemma tubular-fusiform, to 1 cm. long. Awns free to base, subequal, about 3 cm. long, scabridulous. SANTA CRUZ: SARA: Buenavista, 500 m., *Steinbach* 5355 (GH).

## 50. *Tragus* Hall.

*Tragus racemosus* (L.) All. Fl. Pedem. 2: 241 (1785). Weedy annual. Stems somewhat geniculate, to 17 cm. high. Leaf-blades flat, lanceolate, to 2.5 cm. long, 6 mm. wide, acute, ciliate. Inflorescence a terminal spike, spikelets 1-flowered, paired, contiguous by flat faces, first glume absent, second glume about 3-4 mm. long, ovate, convex, the margin and three nerves bearing stout hooked spines, lemma and palea thin-textured. LA PAZ: LARECAJA: Sorata, *Mandon* 1268 (GH); NOR YUNGAS: Milliguaya, 1300 m., *Buchtien* 4176 (GH); SUR YUNGAS: Chulumani, 1600 m., *Hitchcock* 22649 (GH).

## 51. *Aegopogon* Humb. & Bonpl.

Annuals. Culms to 20 cm. long (rarely to 30 cm.), spreading or decumbent. Leaf-blades short, linear, flat, 1-2 mm. wide. Spikelets 1-flowered, pectinately arranged, in groups of 2 or 3, 1 perfect and nearly sessile, the 1 or 2 laterals pedicellate and either staminate or neuter, often purple; glumes narrow, half the length of the lemmas or less, scabridulous, with a rather short delicate awn, lemma with a long central awn and 2 shorter lateral awns, palea with 2 short awns.



Spikelets in groups of 3. .... 1. *Ae. cenchroides*.  
 Spikelets in groups of 2. .... 2. *Ae. bryophilus*.

1. **Aegopogon cenchroides** Humb. & Bonpl. ex Willd. Sp. Pl. 4: 899 (1806). Leaf-blades scabridulous. Fertile spikelets (excluding the awns) about 3 mm. long. Central awn of lemma to 8 mm. long. LA PAZ: NOR YUNGAS: Unduavi, *Buchtien* 2578 (Hitchcock). COCHABAMBA: CERCADO: Cochabamba, *Hitchcock* 22820 (Hitchcock).

2. **Ae. bryophilus** Doell in Mart. Fl. Bras. 2(3): 239 (1880). *Ae. geminiflorus* var. *muticus* Pilger in Engler, Bot. Jahrb. 27: 25 (1899). *Ae. Fiebrigii* Mez in Fedde, Rep. Sp. Nov. 17: 145 (1921). Leaf-sheaths glabrous to scabridulous; blades scabridulous. Fertile spikelets (excluding the awns) about 3 mm. long. Central awn of lemma to 4-6 mm. long. LA PAZ: LARECAJA: Cerro del Iminapi, 2650-3100 m., *Mandon* 1296 (GH); Sorata, *Bang* 1307 (GH; type-number of *Ae. geminiflorus* var. *muticus*). COCHABAMBA: TOTORA: Vacas, 3500 m., *Steinbach* 3965 (GH). TARIJA: ARCE: Camacho, *Fiebrig* 2865 (Hitchcock).

## 52. *Leptochloa* Beauv.

Annual or perennial, the culms decumbent or erect, 3-8 dm. or even to 1 m. high, leaf-sheaths glabrous, glaucous, scabridulous or even sparsely pilose, blades flat, glabrous to sparsely pilose, rarely equaling or exceeding the mature inflorescence. Inflorescence a terminal, narrow to spreading panicle composed of few to many racemes. Spikelets usually many, few- to many-flowered, unilateral on the rachis, the rachilla disarticulating above the glumes, shortly pedicellate, appressed and somewhat imbricate; glumes unequal to nearly equal, 1-nerved; lemmas broad and notched at apex or acute, sometimes awned or mucronate, 3-nerved, glabrous, or pubescent between the lateral nerves and the margin, at least at the base, the uppermost lemma reduced.

- a. Spikelets at least 4 mm. long, usually to 7-9 mm. long.
  - b. Lemmas much exceeding the minutely ciliolate palea. .... 1. *L. uninervia*.
  - b. Lemmas about equal to, sometimes exceeded by, the distinctly ciliate palea. .... 2. *L. dubia*.
- a. Spikelets less than 4 mm. long, never to 7-9 mm. long.
  - c. Leaf-sheaths and blades glabrous, glaucous or rarely scabridulous, not pilose. .... 3. *L. virgata*.
  - c. Leaf-sheaths and blades not glaucous, sparsely long-pilose. .... 4. *L. domingensis*.

1. **Leptochloa uninervia** (Presl) Hitchc. & Chase in Contrib. U. S. Nat. Herb. 18: 383 (1917). Annual. Leaf-sheaths glabrous, blades scabrid. Spikelets (4-) 7-8 mm. long. First glume to 2.5 mm. long, the central nerve carinate and scabrid, acute; second glume 3 mm. long, scabrid on the central nerve, acute, sometimes mucronulate.



Fertile lemmas about 4 mm. long, much exceeding the palea, palea minutely ciliate. COCHABAMBA: CERCADO: Cochabamba, 2560 m., *Steinbach* 8746 (GH).

2. *L. dubia* (HBK). Nees in *Sylog. Pl. Ratisb.* 1: 4 (1824). Perennial. Leaf-blades scabrid. Spikelets to 8-9 mm. long. First glume about 2.5 mm. long; second glume very broad, about 3 mm. long. Fertile lemma to 4-5 mm. long, obtuse, emarginate, with a short central mucro, often pubescent basally between the lateral nerves and the margin. Palea nearly as long as the lemma, occasionally exceeding it, densely ciliate. LA PAZ: MURILLO: Cotaña, 2450 m., *Buchtien* 3136 (GH).

3. *L. virgata* (L.) Beauv. *Ess. Agrost.* 166 (1812). Perennial. Leaf-sheaths and blades glabrous, glaucous, or rarely both scabridulous. Spikelets 3-3.5 mm. long. First glume about 1.5 mm. long; second glume 2 mm. long, both glumes acute, scabridulous on the central nerve. Lowest fertile lemma about 2.5 mm. long, occasionally the lowest 1 or 2 with short awns, usually the lowest puberulent along the lateral nerves. Palea nearly as long as the lemma, ciliate. SANTA CRUZ: SARA: Río Surutú, 400 m., *Steinbach* 6834 (GH).

4. *L. domingensis* (Jacq.) Trin. *Fund. Agrost.* 133 (1820). Perennial. Leaf-sheaths and blades sparsely pilose, not glaucous. Spikelets 2-3.5 mm. long. First glume about 1.5 mm. long; second glume about 2 mm. long. Fertile lemma about 2.5 mm. long, the lowest 1 or 2 awned, the awns to 2 mm. long, margins long-ciliate. Palea somewhat shorter than the lemma, not ciliate or only faintly so at the apex. LA PAZ: NOR YUNGAS: Coripata, *Hitchcock* 22692 (GH). SANTA CRUZ: SARA: Dolores, 450 m., *Steinbach* 1891 (GH); Buenavista, 450-500 m., *Steinbach* 1179 (GH), 5222 (GH), 6730 bis (GH).

### 53. *Gouinia* Fourn.

See Swallen in *Amer. Journ. Bot.* 22: 31-41 (1935).

Tufted perennials, the culms erect, to 1-1.5 m. high, leaf-sheaths glabrous, leaf-blades scabrid beneath, to 8-14 mm. wide, not equaling the inflorescence. Inflorescence an open racemose panicle. Spikelets few-flowered, the uppermost reduced, in racemes to 15 cm. long, pedicellate; rachilla glabrous; glumes subequal or the second longer, 3-nerved; lemmas longer than glumes, densely villous on the nerves, awned, the awns scabridulous.

Second glume rather obtuse, long-mucronate; panicle-branches bearing spikelets from the base; awn to 1.6 cm. long. ....

..... 1. *G. brasiliensis*.

Second glume acute, not mucronate; panicle-branches bearing spikelets from the middle upward; awn about 5 mm. long. ....

..... 2. *G. latifolia*.

1. *Gouinia brasiliensis* (S. Moore) Swallen in *Amer. Journ. Bot.* 22: 36 (1935). First glume 4 mm. long; second glume 6 mm. long. Lower



lemmas 7-8 mm. long, the awns to 1.6 cm. long. SANTA CRUZ: CORDILERA: Puerto Suarez, *Chase* 11151 (GH).

2. *G. latifolia* (Griseb.) Vasey in *Contrib. U. S. Nat. Herb.* 1: 365 (1895). Glumes subequal, about 5 mm. long. Lower lemmas 7 mm. long, the awns about 5 mm. long. LA PAZ: NOR YUNGAS: Chulumani, 1600 m., *Hitchcock* 22650 (GH).

#### 54. *Tripogon* Roem. & Schult.

*Tripogon spicatus* (Nees) Ekman in *Ark. Bot.* 11(4): 36 (1912). Densely tufted low perennial. Leaves filiform, glabrous, chiefly basal, much shorter than the culms. Inflorescence a single terminal spike, the entire culm and inflorescence usually less than 25 cm. long (60 cm. in one instance). Spikelets 5-9 mm. long, several- to many-flowered, with more than 1 perfect floret, sessile in 2 rows on the axis but usually appearing unilateral, the rachilla disarticulating above the glumes and between the florets; first glume 2 mm. long or less, subacute, second glume 2.5 mm. long, obtuse; lemmas about 3 mm. long, 3-nerved, the central nerve somewhat carinate and prolonged as a slender awn about 1 mm. long from between 2 small apical teeth, at least the lowermost lemmas with a small basal tuft of hairs; palea hyaline, much shorter than the lemma and enclosed by it. SANTA CRUZ: [province uncertain]: between Río Piray and Río Cuchi, *Herzog* 1449 (*Hitchcock*).

#### 55. *Eleusine* Gaertn.

*Eleusine indica* (L.) Gaertn. *Fruct. & Sem.* 1: 8 (1788). Weedy annual, the culms ascending to spreading, rarely to 1 m. high, but usually less than 5 dm. Leaves nearly glabrous, the sheaths hirsute near the apex and with a ring of hairs at the apex; leaf-blades flat or folded, to 8 mm. wide, some equaling or exceeding the inflorescence, glabrous. Inflorescence terminal, with 2-5 digitate or subdigitate spikes to 10 cm. long, the spikelets in 2 rows but unilateral on the axis. Spikelets few- to several-flowered, with more than 1 perfect floret below sterile florets, sessile, 3-4 mm. long, the rachilla disarticulating above the glumes and between the florets; glumes awnless, strongly keeled, the keel scabrid, acute, first glume about 2 mm. long, the second glume about 3 mm. long; lemmas strongly keeled, the keels scabridulous, about 3 mm. long; palea bicarinate, the nerves green; caryopsis subglobose to subtrigonal, brown, finely and transversely striate. LA PAZ: LARECAJA: Hacienda Simaco, 1400 m., *Buchtien* 5332 (GH); NOR YUNGAS: Polo-Polo, near Coroico, 1100 m., *Buchtien* (in 1912) 238 (GH); Milliguaya, 1300 m., *Buchtien* (in 1917) 238 (GH). SANTA CRUZ: SARA: Río Surutú, 400 m., *Steinbach* 6837 (GH); Buenavista, 500 m., *Steinbach* 5149 (GH), 1871 (GH).



### 56. *Dactyloctenium* Willd.

*Dactyloctenium aegyptium* (L.) Willd. Enum. Hort. Berol. 1029 (1809) [as *aegyptiacum*]. Weedy, rather pilose annual, spreading by stolons and forming mats, culms erect, to 6 dm. high, leaf-sheaths glabrous or nearly so, the flat leaf-blades pilose and ciliate, shorter than the inflorescence. Inflorescence terminal, of 2-5 digitately arranged spikes 2-5 cm. long, the rachis exceeding the spikelets as a short subulate point, spikelets in 2 rows, unilateral on the axis. Spikelets several-flowered, sessile, imbricate, about 9 mm. long, the rachilla disarticulating above the glumes and between the florets; first glume about 3 mm. long, 1-nerved, acute, the second glume longer, with a short scabridulous awn arising from below the apex; lemma about 6 mm. long, 3-nerved, the central nerve keeled, scabridulous, the apex acuminate to short-awned; palea a little shorter than the lemma; caryopsis nearly globose, wrinkled or ridged. SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 3132 (GH).

### 57. *Cynodon* L. Rich.

*Cynodon Dactylon* (L.) Pers. Synops. Pl. 1: 85 (1805). Low perennial, the stolons spreading extensively and rooting at the nodes, the culms produced at the nodes, with a few basal leaves, the sheaths glabrous, the short (2-3 cm.) blades scabridulous, the culms clothed in leaf-sheaths with greatly reduced free tips; fertile culms 10-40 cm. high. Inflorescence terminal, digitate, 3-6 spikes to 5 cm. long, the sessile spikelets in 2 rows along the axis, unilateral, imbricate. Spikelets 1-flowered, the rachilla disarticulating above the glumes and produced as a slender bristle behind the palea; glumes almost equal, to 3 mm. long, or the first glume shorter than the second, narrow, strongly keeled, the keel scabrid; lemma awnless, to 3 mm. long or a little longer, usually somewhat exceeding the second glume, naviculate, brown-hyaline, the central keel prominent and densely pubescent, the margins long-ciliate; palea somewhat shorter than the lemma. SANTA CRUZ: CERCADO: playa del Río Piray, 450 m., *Steinbach* 3246 (GH).

### 58. *Microchloa* R. Br.

*Microchloa indica* (L. f.) Beauv. Ess. Agrost. 13 (1812). Tufted annual, usually low in stature but sometimes the erect culms to 25 cm. high, leaves glabrous, the very narrow blades flat or folded, not equaling the inflorescence. Inflorescence a solitary terminal spike to 10 cm. long, the axis bifariously puberulent on the side toward the spikelets, the spikelets unilateral on the axis. Spikelets 1-flowered, about 3 mm. long, sessile or subsessile; disarticulation above the glumes; glumes subequal, 2.5 mm. long, 1-nerved, acute; lemma and



palea subequal, about 2 mm. long, acute, hyaline, the upper portion more or less densely covered by a long silky pubescence; caryopsis brown, subtrigonous, finely reticulate-striate. LA PAZ: MURILLO: La Paz, 3600 m., *Buchtien* 3130 (GH); Obrajes, 3450 m., *Buchtien* 9132 (GH).

### 59. *Gymnopogon* Beauv.

Loosely tufted perennials, the slender culms erect or spreading, 3-8 dm. high, leaves glabrous, the blades 2-5 cm. long and 2-5 mm. wide, reduced upward on the culm, never equaling nor exceeding the inflorescence. Inflorescence a terminal panicle of slender racemes 5-25 cm. long. Spikelets many, pedicellate, with 1-2 perfect florets below 1-3 sterile florets, rachilla disarticulating above the glumes; glumes subequal; fertile lemma long-awned, more or less terete.

Racemes to 5 cm. long, collected near the apex of the culm; spikelet 2-flowered. .... 1. *G. jubiflorus*.

Racemes 10-25 cm. long, distant along the main axis; spikelet 1-flowered, with 1-2 much reduced florets. .... 2. *G. spicatus*.

1. ***Gymnopogon jubiflorus*** Hitchc. in Contrib. U. S. Nat. Herb. 24: 412 (1927). Glumes subequal, the second slightly longer than the first, 3.5-4 mm. long, lance-acuminate. Fertile lemma about 2 mm. long with an apical tuft of hairs to 1.5 mm. long, the awn about 8 mm. long. Palea about as long as the lemma. LA PAZ: LARECAJA: Guanay, *Rusby* 215 (US; type).

2. ***G. spicatus*** (Spreng.) O. Ktze. Rev. Gen. 3(2): 354 (1898). First glume 3.5 mm. long; second glume 4 mm. long. Fertile lemma very narrow, 2.5 mm. long, apical hairs very short, awn 8-10 mm. long. SANTA CRUZ: SARA: Buenavista, 450-500 m., *Steinbach* 1932 (GH), 2357 (GH), 5386 (GH), 6977 (GH).

### 60. *Chloris* Swartz

Annual or perennial, with decumbent to erect culms 2 dm. to 1 m. high, leaves glabrous or scabrid or sparsely pilose, the short blades to 1 cm. wide, not equaling the inflorescence. Inflorescence terminal, composed of digitately arranged spikes in 1 or 2 whorls, the sessile spikelets unilaterally arranged. Spikelets with 1 perfect floret below 1-2 (-3) reduced and rudimentary florets, rachilla disarticulating above the glumes; glumes unequal, lemmas mucronulate or awned (awnless in no. 1).

a. Lemmas awnless. .... 1. *C. distichophylla*.

a. Lemmas awned or mucronulate.

b. Fertile lemmas not villous on keel (sometimes sparsely villous above), nor ciliate; sterile floret narrow, acute at apex.

c. Spikelets about 5 mm. long; fertile lemma 3-5 mm. long.

d. Spikes 6-10, 5-8 cm. long. .... 4. *C. Beyrichiana*.



- d. Spikes 6-15, 7-15 cm. long. .... 5. *C. halophila*.  
 c. Spikelets about 3 mm. long; fertile lemma about 2 mm. long.  
 ..... 6. *C. radiata*.  
 b. Fertile lemmas villous on keel, at least on lower half (rarely  
 glabrous), margins ciliate; sterile floret broad and truncate at  
 the apex.  
 e. Lemma long-ciliate from base to apex, the hairs 3 mm. long;  
 perennial. .... 2. *C. polydactyla*.  
 e. Lemma only shortly ciliate, or glabrous at base, the hairs  
 increasing in length upward, the keel rarely glabrous; annual.  
 ..... 3. *C. virgata*.

1. ***Chloris distichophylla*** Lag. Gen. & Sp. Nov. 4 (1816). Perennial. Spikelets about 3 mm. long. First glume somewhat less than 2 mm. long, 1-nerved, acute; second glume about 2.5 mm. long, 1-nerved, often mucronulate. Fertile lemma about 3 mm. long, mucronulate, the margin ciliate with long hairs decreasing in length upward. Palea shorter than the lemma. Sterile lemma shorter than the fertile, glabrous, obtuse at apex but not broadest at apex. LA PAZ: Yungas, *Bang* 267 (GH); NOR YUNGAS: Polo-Polo, near Coroico, 1100 m., *Buchtien* 228 (GH); SUR YUNGAS: Chulumani, 1600 m., *Hitchcock* 22663 (GH). SANTA CRUZ: SARA: Buenavista, 450-500 m., *Steinbach* 5359 (GH), 6867 (GH).

2. ***C. polydactyla*** (L.) Swartz, Prodr. 26 (1788). Spikelets to 3.5 mm. long. First glume about 2.5 mm. long, the single nerve scabridulous; second glume about 3.5 mm. long, the central nerve scabrid. Fertile lemma about 2.5 mm. long, with a 3.5 mm. awn. LA PAZ: NOR YUNGAS: Milliguaya, 1300 m., *Buchtien* 739 (GH); Coripata, *Hitchcock* 22689 (GH).

3. ***C. virgata*** Swartz, Fl. Ind. Occ. 1: 203 (1797). Spikelets about 4 mm. long. First glume 2 mm. long; second glume 4 mm. long, mucronulate to short-awned. Fertile lemma about 3 mm. long, the awn about 1.1 cm. long. Palea about 3 mm. long, the 2 nerves lateral and ciliolate. COCHABAMBA: CERCADO: Valle de Cochabamba, 2600 m., *Steinbach* 8796 (GH).

4. ***C. Beyrichiana*** Kunth, Rév. Gram. 1: 289 (1830). Perennial. Spikelets about 5 mm. long. First glume 3 mm. long, long-acute, the nerve scabridulous; second glume about 4.5 mm. long, long-acute, the nerve scabridulous. Fertile lemma about 4.5 mm long, strongly bidentate, the awn to 1.7 cm. long. Palea shorter than lemma, densely ciliolate. LA PAZ: MURILLO: La Paz, 3300 m., *Bang* 82 (GH). COCHABAMBA: MIZQUE: Vilavila, 2500 m., *Eyerdam* 24987 (GH). TARIJA: CERCADO: Tarija, 2000 m., *Cárdenas* 200 (GH).

5. ***C. halophila*** L. R. Parodi in Revist. Argent. Agron. 12: 45 (1945). Perennial. Spikelets 5-6 mm. long. First glume 2.5 mm. long; second glume 4-4.5 mm. long. Fertile lemma about 5-5.5 mm.



long, bidentate, the awn 2 cm. long, the margins sparsely ciliate above. LA PAZ: MURILLO: Obrajes, 3400 m., *Buchtien* 573 (GH).

The original description cited several collections from the departments of Cochabamba and Tarija. I have not seen these.

6. *C. radiata* (L.) Swartz, Prodr. 26 (1788). Annual. Spikelets about 3 mm. long, but sometimes up to 5 mm. First glume about 1.5 mm. long; second glume about 3 mm. long, long-acute to very shortly awned, margins sparsely ciliate above. Palea as long as the lemma, bidentate. LA PAZ: NOR YUNGAS: near Coripata, 1700 m., *Buchtien* 8056 (GH), *Bang* 2173 (GH).

### 61. *Trichloris* Fourn.

Tufted perennials, the erect culms to 1 m. high, usually shorter, leaves scabrid on sheaths and blades, blades 2-10 mm. wide, not exceeding the inflorescence. Inflorescence a group of terminal spikes 5-15 cm. long. Spikelets 2-5-flowered, fertile florets below the sterile, the rachilla disarticulating above the glumes, subsessile, in 2 rows, unilateral on the rachis; first glume shorter than the second, mucronate or shortly awned; lemmas with a tuft of hairs at the base, 1-3-awned, all awns scabridulous.

Leaf-blades to 4 mm. wide; lemmas 3-awned, the awns all long; spikelets 2-flowered, the upper floret much reduced; inflorescence dense. .... 1. *T. mendocina*.

Leaf-blades to 10 mm. wide; lemmas with lateral awns much reduced or obsolete; spikelets 3-5-flowered, the uppermost much reduced; inflorescence much more open. .... 2. *T. pluriflora*.

1. *Trichloris mendocina* (Phil.) Kurtz in Mem. Fac. Cienc. Exact. Univ. Córdoba, 1897: 37 (1897). Spikelet about 3-4 mm. long (excluding the awns). First glume about 1 mm. long, very narrow, the awn 1.5 mm. long; second glume 2 mm. long, the awn 3 mm. long. Lowest lemma to 4 mm. long, pubescent on the upper portion, awns to 1.2 cm. long. SANTA CRUZ: CERCADO: Mataral, *Herzog* 1804 (Hitchcock).

2. *T. pluriflora* Fourn. Mex. Pl. 2: 142 (1886). Spikelet about 6 mm. long (excluding the awns). First glume about 1.5 mm. long, the awn much shorter; second glume about 2.5 mm. long, the awn about 0.5 mm. long. Lowest lemma 4 mm. long, ciliate, awns about 6 mm. long. SANTA CRUZ: VALLEGRANDE: Comarapa, *Herzog* 1928 (US).

### 62. *Bouteloua* Lag.

See Griffiths in Contrib. U. S. Nat. Herb. 14: 343-428 (1912).

Annual or perennial, the culms erect or decumbent, mostly 10-20 cm. high, occasionally to 1 m. high, leaves generally glabrous, sometimes sparsely hirsute near the edge of the sheath and on the base



of the blade, always shorter than the inflorescence, the blade narrow. Inflorescence terminal, a solitary spike or few to many short racemose spikes. Spikelets sessile, 1-flowered, with a rudimentary floret above the perfect one, unilaterally arranged; glumes present, unequal; fertile lemma 3-5-toothed, awned or awnless.

- a. Spike 1, persistent, the spikelets falling separately. .... 1. *B. simplex*.  
 ..... 1. *B. simplex*.  
 a. Spikes few to several, each spike falling entire.  
 b. Awns 2-3 cm. long. .... 2. *B. megapotamica*.  
 b. Awns much shorter.  
 c. Spikes at maturity erect or spreading; rachis sharply pointed at base and retrorsely bearded. .... 3. *B. aristidoides*.  
 c. Spikes at maturity deflexed, rachis-base neither pointed nor bearded. .... 4. *B. curtispindula*.

1. ***Bouteloua simplex*** Lag. in *Varied. Cienc.* 29(4): 141 (1805). Annual. First glume 3.5 mm. long, faintly 1-nerved; second glume to 5 mm. long, acute, strongly 1-nerved. Fertile lemma with a tuft of hairs at base, to 3 mm. long, the central awn 3 mm. long, sparsely pilose at base and along midrib. LA PAZ: MURILLO: La Paz, 3300 m., *Bang* 81 (GH); LARECAJA: vic. Sorata; Lorecasa, 2650-3200 m., *Mandon* 1325 (GH). POTOSÍ: CERCADO: Potosí, 4000 m., *Cárdenas* 197 (GH). TARIJA: AVILES: Puna Patanca, 3700 m., *Fiebrig* 2629 (GH).

2. ***B. megapotamica*** (Spreng.) O. Ktze. *Rev.* 3(2): 341 (1898). Perennial. Spikelet with basal tufts of hairs. First glume 3 mm. long with a 3 mm. awn, 1-nerved; second glume 7 mm. long with a 3 mm. awn, very strongly 1-nerved. Fertile lemma 4 mm. long with the central awn 1 cm. long. Palea longer than the lemma, bidentate. Reduced florets with awns to 3 cm. long. TARIJA: ARCE: Padcaya, 2100 m., *Fiebrig* 2552 (GH).

3. ***B. aristidoides*** (HBK.) Griseb. *Fl. Brit. W. Ind.* 537 (1864). Annual. First glume 2.5 mm. long, acute, 1-nerved; second glume 7 mm. long, puberulent at base, scabridulous above, awnless. Fertile lemma about 6 mm. long, glabrous, awnless. Palea as long as lemma, bidentate. Awns of sterile lemmas to 6 mm. long. TARIJA: Gran Chaco, *Fries* 1691 (Hitchcock).

4. ***B. curtispindula*** (Michx.) Torr. in Marcy, *Red River Rept.* 300 (1853). Perennial, the culms up to 1 m. high. First glume 3 mm. long, attenuate into a 2 mm. awn, the prominent central rib hispidulous; second glume 7 mm. long, awnless, bidentate, with a short point between the teeth, scabridulous near the margin and on the prominent central nerve. Fertile lemma about 6 mm. long, glabrous below, scabridulous above and on the 3 long teeth. Palea as long as lemma, bidentate, the upper half scabridulous. LA PAZ: LARECAJA: Sorata, *Mandon* 1380 (GH). COCHABAMBA: CERCADO: west of Cochabamba, 2700 m., *Eyerdam* 24875 (GH). TARIJA: ARCE: Padcaya, *Fiebrig* 3281 (GH), 3282 (GH).



63. *Munroa* Torr.

See L. R. Parodi in *Revist. Mus. La Plata*, 34: 171-193 (1934).

Low-growing, more or less tufted, spreading annuals, 2-15 cm. high, the leaves very short, the sheaths very broad, blades a few cm. long, the apex pungent. Inflorescence condensed into heads or glomerules, these more or less concealed by the sheaths of the fasciated subtending leaves. Spikelets aggregated in groups of 2 or 3, the lower 3-4-flowered, the upper 2-3-flowered, the first floret in the spikelet perfect, the others sterile, usually 3 groups in a cluster, the rachilla disarticulating above the glumes; glumes usually quite unequal; lemmas 3-nerved, the nerves much or little prolonged as awns or mucros. Caryopsis dorsally compressed.

- a. Lowest fertile lemma 4-lobed with 3 awns, the central awn longest; back of lemma with 2 tufts of hairs below the central sinus of the lobes; 2 central lobes broader than the 2 lateral, the former rather obtuse, the latter acute; margins long-ciliate for over half their length; palea with puberulent nerves. .... 1. *M. andina*.
- a. Lowest fertile lemma 2-3-toothed, the central tooth narrower than the laterals, its apex subaristate, the laterals mucronulate; palea glabrous.
  - b. Lowest lemma papery at base, 2-toothed with a central awn, the back with 2 tufts of hairs, the margin long-ciliate below or above the middle, the hairs reaching neither apex nor base; palea broadest at apex. .... 2. *M. decumbens*.
  - b. Lowest fertile lemma coriaceous at base, 3-toothed; dorsal tufts of hairs absent, the margin long-ciliate above the middle; palea broadest at the base. .... 3. *M. argentina*.

1. *Munroa andina* Phil. in *Anal. Mus. Nac. Chile*, 8: 90 (1891). Leaf-blades about 1 cm. long, 1 mm. wide. Glumes unequal, the second to 4 mm. long, mucronulate. Lowest lemma about 3.5 mm. long. LA PAZ: PACAJES: Calacota, 3800 m., *Asplund* 2653.

1a. *M. andina* var. *brevisetata* Hack. ex Stuckert in *Ann. Conserv. & Jard. Bot. Genève*, 17: 294 (1914). This variety is distinguished by the lowest lemma with very short awns, hardly, if at all, exceeding the lemma-lobes. LA PAZ: PACAJES: Charaña, 4050 m., *Asplund* 2691.

2. *M. decumbens* Phil. in *Anal. Mus. Nac. Chile*, 8: 90 (1891). Leaf-blades to 2.5 cm. long and 2 mm. wide. Glumes unequal, the second to 4.5 mm. long. Lowest lemma about 4 mm. long, with a 3 mm. central awn between the 2 lobes. POTOSÍ: NOR LIPEZ: Chiguana, 3700 m., *Asplund* 6504 (US); PORCO: Uyuni, 3700 m., *Asplund* 6487 (US).

3. *M. argentina* Griseb. in *Goett. Abh.* 24: 300 (1879). Leaf-blades 2 cm. long, 1 mm. wide. Glumes subequal, about as long as the lowest lemmas. Lowest lemma to 5 mm. long. POTOSÍ: SUR CHICHAS: Atocha,



3700 m., *Asplund* 6485 (US). CHUQUISACA: SUR CINTI: Camataquí, 2500 m., *Fiebrig* 2801.

With three exceptions, all specimen-citations have been taken from Parodi's treatment of the genus.

#### 64. *Phalaris* L.

Annuals, the culms erect. Leaf-blades linear, flat, acute, from much shorter than to exceeding the inflorescence, to 6 mm. wide. Inflorescence a terminal spicate panicle. Spikelets strongly flattened, densely imbricate, the perfect floret terminal with 2 sterile lemmas below it, all concealed by the glumes; disarticulation above the glumes; glumes papery white with green stripes, the green keel broadly winged, or narrowly winged near the acute apex; sterile lemmas one-half to one-third as long as the appressed-pubescent coriaceous fertile lemma, the bicarinate palea enclosed by the fertile lemma.

Culms 3-6 dm. tall, inflorescence ovate, broad, to 5 cm. long or less; glumes broadly winged, 7-8 mm. long, sparsely long-hirsute, the hairs usually appressed. .... 1. *P. canariensis*.

Culms 1-1.5 m. tall, sometimes shorter; inflorescence narrowly cylindrical, 6-15 cm. long; glumes not winged or only narrowly so, especially near the apex, 3.5-4 mm. long, shortly ciliolate on keel and 2 chief nerves. .... 2. *P. angusta*.

1. *Phalaris canariensis* L. Sp. Pl. 54 (1753). LA PAZ: MURILLO: La Paz, *Buchtien* 239 (Hitchcock); NOR YUNGAS: Coroico, *Buchtien* 3641 (Hitchcock).

2. *P. angusta* Nees ex Trin. Gram. Icon. 1: t. 78 (1827). LA PAZ: LARECAJA: Sorata, *Mandon* 1246 (Hitchcock).

#### 65. *Leersia* Swartz

*Leersia hexandra* Swartz, Prodr. 21 (1788). Perennial, often subaquatic, scabrous or scabridulous, many culms decumbent, rhizomes slender and producing leafy stolons, fertile culms erect, sometimes to 2 m. tall, usually shorter. Leaf-blades narrow, linear-lanceolate, to 15-20 cm. long and 5 mm. wide, long-acute. Inflorescence a narrow panicle to 15 cm. long, the branches appressed. Spikelets solitary, 1-flowered, the floret perfect, disarticulating from the very short pedicel, strongly flattened, glumes lacking, lemma and palea similar in appearance, to 4-5 mm. long, often pinkish or purplish, subequal in length and width, oblong to narrowly ovate, acute, with 3 prominent ribs, these often hispidulous or the entire lemma hispidulous, the margins coarsely ciliate. SANTA CRUZ: SARA: playa del Río Perdix, 450 m., *Steinbach* 7453 (GH); Buenavista, 450 m., *Steinbach* 2180 (GH), 7116 (GH).



66. *Luziola* Juss.

*Luziola peruviana* Gmel. Syst. Nat. 1: 637 (1791). Perennial, usually of wet or muddy areas or even in water, the slender culms to 40 cm. long, but usually much shorter, often decumbent, branching, fertile culms erect. Leaf-blades more or less linear, long-acute, to 30 cm. long, usually much shorter, 1-4 mm. wide, exceeding the inflorescences. Spikelets 1-flowered, unisexual, disarticulating from the filiform pedicels, pistillate and staminate spikelets in separate panicles on the same plant, the staminate panicles terminal, the pistillate terminal and axillary, both short, to 6 cm. long; pistillate spikelets 2-3 mm. long, the stigmas long-plumose, the staminate spikelets 4-7 mm. long; glumes absent in both; lemma and palea similar in appearance and subequal, thin-textured, with several to many nerves, the nerves often scabridulous; caryopsis globose, rather shiny, finely striate, about 1 mm. long or longer, sometimes shortly beaked with the persistent base of the style. SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 1946 (GH), 6811 (GH). TARIJA: ARCE, La Merced, near Bermejo, 1700 m., *Fiebrig* 2189 (GH).

67. *Pharus* L.

Perennials, often in wet places, the culms to 1 m. high, solitary and erect, or creeping at the base and rooting at the basal nodes, forming mats. Leaf-blades petiolate, the petiole once-twisted, elliptic-oblong or lanceolate, the principal veins connected by numerous and obvious small parallel cross-veins. Inflorescence a reduced to expanded small panicle; spikelets 1-flowered, appressed, paired, the small staminate spikelet pedicellate, the pistillate sessile; 2 glumes present, dark-brown; disarticulation above the glumes; lemma terete, much exceeding the glumes, somewhat indurate, beaked, entirely or partially pubescent, the hairs somewhat unciniate, the margins incurved and concealing the palea.

- a. Lemma entirely pubescent.
  - b. Culms creeping at base and forming mats; inflorescence usually reduced and few-branched. .... 3. *P. parvifolius*.
  - b. Culms erect, solitary; inflorescence larger and more open. ....  
..... 1. *P. glaber*.
- a. Lemmas pubescent only near the beak. .... 2. *P. latifolius*.

1. *Pharus glaber* HBK. Nov. Gen. & Sp. 1: 196 (1816). Spikelets about 1 cm. long, about twice the length of the glumes. Leaf-blades to 25 cm. long and 5 cm. wide, abruptly short-acuminate. LA PAZ: NOR YUNGAS: Milluguaya, 900 m., *Buchtien* 4173 (GH).

2. *P. latifolius* L. Syst. Nat. (ed. 10) 2: 1269 (1759). Spikelets 1.5-2 cm. long, exceeding, but seldom twice the length of, the glumes. Leaf-blades generally broader. No Bolivian material which is un-



questionably this species has been seen, but it seems probable that the species will be found there.

3. *P. parvifolius* Nash in Bull. Torr. Bot. Club, 35: 301 (1908). Spikelets less than 1.5 cm. long. Leaf-blades generally broadest below the middle, sometimes long-acuminate. LA PAZ: SUR YUNGAS: Covendo, *White* (M. E.) 1043 (Hitchcock).

### 68. *Arundinella* Raddi

Tufted perennials, the erect culms from 1-2.5 m. high. Leaf-sheaths glabrous; leaf-blades shorter than or equaling the inflorescence, to 5 mm. wide, hirsutulous to scabrid along the nerves, or glabrous. Inflorescence a rather dense panicle, the pedicellate spikelets solitary. Spikelets 2-flowered, the lower floret staminate or sterile, the upper pistillate; first glume much shorter than the second, the apices divergent and often somewhat acuminate, strongly 3-nerved, the second glume at least twice the length of the sterile and fertile lemmas, or equal to the sterile lemma; disarticulation above glumes; fertile lemma shortly villous on the basal callus, scabridulous, bearing a geniculate awn about 1 cm. long or less, completely enclosing the palea.

Culms to 2.5 m. high; inflorescence-branches and pedicels densely and retrorsely scabridulous; glumes 2-2.5 mm. long; lemmas 2-2.5 mm. long; awn basally twisted, about 2 mm. long. .... 1. *A. confinis*.

Culms usually less than 1 m. high; inflorescence-branches and pedicels glabrous to faintly scabridulous; glumes 3-5 mm. long; lemmas 1.5 mm. long; awn about 1 cm. long, not twisted basally. ....

..... 2. *A. Berteroniana*.

1. *Arundinella confinis* (Schult.) Hitchc. & Chase in Contrib. U. S. Nat. Herb. 18: 290 (1917). SANTA CRUZ: SARA: Buenavista, *Steinbach* 6888 bis (GH).

2. *A. Berteroniana* (Schult.) Hitchc. & Chase in Contrib. U. S. Nat. Herb. 18: 290 (1917). LA PAZ: LARECAJA: Mapiri, *Buchtien* 1175; SUR YUNGAS: Covendo, *White* (M. E.) 995. BENI: YACUMA; Rurrenabaque, *Cárdenas* (M. E.) 1166. Citations from Hitchcock.

### 69. *Trichopteryx* Nees

*Trichopteryx flammida* (Trin.) Benth. ex Jacks. & Hook. f. Index Kew. 4: 1109 (1895). Tufted perennial, the culms 1.5-2 m. high. Leaf-sheaths glabrous to hirsute; leaf-blades sometimes exceeding the inflorescence, flat, to 7 mm. wide. Inflorescence terminal, a rather dense panicle, to 60 cm. long, the spikelets solitary, pedicellate, the pedicels bearing a few long hairs at the apex. Spikelets 2-flowered, the lower floret staminate, glabrous and awnless, the upper floret pistillate; first glume 4-5 mm. long, strongly 3-nerved, the nerves ciliolate, with 3-5 erect hairs 3-4 mm. long near the apex, second



glume 4-5 mm. long, less strongly nerved, glabrous; disarticulation above the glumes; lemma of staminate floret about 6 mm. long, glabrous, nearly twice the length of the hyaline palea; lemma of pistillate floret 3-4 mm. long, densely long-pubescent, bearing a scabridulous awn up to 2 cm. long, this geniculate shortly above its base. LA PAZ: LARECAJA: San Carlos, Mapiri, 850 m., *Buchtien* 9 (GH). SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 1884 (GH), 5358 (GH), 6958 (GH).

The authorship of this combination is often given as Bentham in *Journ. Linn. Soc. Bot.* 19: 59 (1882), but examination shows that the combination was not actually made there. It was merely implied.

### 70. *Tristachya* Nees

*Tristachya chrysothrix* Nees, *Agrost. Bras.* 460 (1829). Tufted perennial, the culms to 1 m. high, the leaf-sheaths hirsute to hispidulous or glabrous. Leaf-blades flat to involute, hirsute to almost glabrous, not exceeding the inflorescence, to 4 mm. wide (when flattened). Inflorescence a lax, nearly simple panicle, the branches puberulent to glabrous below, hirsute above, the hairs golden-brown, spikelets sessile in groups of 3, terminal on the branches. Spikelets 2-flowered, the lower floret staminate and awnless, the upper floret pistillate; first glume about 1 cm. long, 3-nerved, each lateral nerve with a row of short, dark brown tubercles, each bearing a long golden-brown hair, second glume to 1.5 cm. long, pubescent along the margins in the upper portion; disarticulation above the glumes; lemmas of staminate floret glabrous, about 1.2 cm. long, the palea 2-nerved, ciliate; lemma of pistillate floret about 7 mm. long, densely pubescent, the base surrounded by longer, white, silky hairs, bearing a twisted awn 4-7 cm. long, rising between 2 slender teeth, the lower portion brown and hispidulous, the upper portion green and more nearly scabridulous. SANTA CRUZ: VALLEGRANDE: Samaipata, 2000 m., *Steinbach* 3772 (GH).

### 71. *Leptocoryphium* Nees

*Leptocoryphium lanatum* (HBK.) Nees, *Agrost. Bras.* 84 (1829). Perennial, to 1 m. high. Leaves glabrous, the blades flat or often involute, to 3 mm. wide, linear. Inflorescence a rather lax, narrow, racemose, terminal panicle, the rachis, branches and pedicels glabrous. Spikelets 2-flowered, the lower floret a sterile lemma, the other perfect, disarticulation below the glumes. First glume absent; second glume to nearly 5 mm. long, strongly several-nerved, long-pilose, the hairs mostly confined to the nerves. Sterile lemma as long as the glume and similar in appearance and pilosity. Fertile lemma about as long



as the sterile, thin-textured, the margins sparsely ciliate, the apex slightly erose-fimbriate. Palea nearly as long as the fertile lemma, thin, not carinate. LA PAZ: LARECAJA: Hacienda Casana, 1600 m., *Buchtien* 7146 (GH). SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 3269 (GH), 6639 (GH), 6640 (GH).

## 72. *Trichachne* Nees

Perennials, the bases somewhat swollen and felty-pubescent or scaly. Leaf-sheaths glabrous or papillate-hirsute; leaf-blades glabrous or scabridulous. Inflorescence a panicle of shortish racemes. Spikelets paired, pedicellate, 2-flowered, the lower floret a sterile lemma, the upper floret perfect, silky-villous; disarticulation below the glumes. Glumes very unequal; second glume and sterile lemma similar and subequal; fertile lemma firm-textured and acuminate; palea similar but narrower.

a. Sterile lemma silky-villous dorsally. .... 1. *T. insularis*.  
 a. Sterile lemma glabrous dorsally.

b. Leaf-sheaths glabrous; blades to 7-8 mm. wide; fertile lemma about 3 mm. long. .... 2. *T. sacchariflora*.

b. Leaf-sheaths sparsely papillate-hirsute (at least when young); blades to 5 mm. wide, glabrous to puberulent; fertile lemma 2.5 mm. long. .... 3. *T. californica*.

1. *Trichachne insularis* (L.) Nees, *Agrost. Bras.* 86 (1829). Plants to 1.5 m. tall. Leaf-sheaths rather sparsely papillate-hirsute; leaf-blades to 1.5 cm. wide, scabridulous above. Panicle to 3 dm. long, the racemes to 15 cm. long, tawny when mature. Spikelets to 4 mm. long. First glume over 0.5 mm. long, obtuse; second glume 3 mm. long, acute, silky-villous. Sterile lemma 4 mm. long, not glabrous dorsally. Fertile lemma 3.5 mm. long. LA PAZ: NOR YUNGAS: Milluguaya, 1200 m., *Buchtien* 4188 (GH). COCHABAMBA: CHAPARE: Antahuacana, Espiritu Santo, 750 m., *Buchtien* s. n. (GH).

2. *T. sacchariflora* (Raddi) Nees, *Agrost. Bras.* 87 (1829). *T. affinis* Swallen in *Rhodora*, 65: 355 (1963). Plants to 8 dm. tall. Leaf-sheaths glabrous; leaf-blades to 7-8 mm. wide, glabrous. Panicle to 20 cm. long, the racemes often more than 5 cm. long. Spikelets about 3-4 mm. long, silky-villous, the hairs white to purplish. First glume less than 0.5 mm. long, apex broadly truncate and usually erosulous, glabrous; second glume as long as the spikelet, acute, the hairs basal, marginal and on the nerves. Sterile lemma as long as the spikelet, acute, apically somewhat lanate-penicillate, the remaining hairs between the margins and the marginal nerves. Fertile lemma about 3 mm. long, longitudinally striatulate. LA PAZ: LARECAJA: San Carlos, Mapiri, 850 m., *Buchtien* 31 (GH). SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 6638 (GH), 6876 (GH); Dolores, 450 m., *Steinbach* 1911 (GH).

3. *T. californica* (Benth.) Chase in *Journ. Wash. Acad. Sci.* 23:



455 (1933). *T. saccharata* of the Catalogue. Plants 4-10 dm. tall. Leaf-sheaths glabrous to sparsely papillate-pilose; leaf-blades to 5 mm. wide, glabrous to puberulent. Panicle to 10 (-15) cm. long, racemes few, mostly to 5 cm. long. Spikelets about 3-3.5 mm. long, mostly obscured by the long white hairs. First glume about 0.5 mm. long, truncately obtuse to subacute. Sterile lemma as long as the spikelet, 3-nerved, densely villous between the marginal nerves and the margin, glabrous dorsally. Fertile lemma 2.5 mm. long, glabrous, finely striatulate. COCHABAMBA: CERCADO: Cochabamba, *Holway* 321 (Hitchcock), 368 (Hitchcock).

### 73. *Digitaria* Heister

See Henrard, J. Th. Monograph of the Genus *Digitaria*. Leiden, 1950.

Annuals or perennials, the culms 0.4-1 m. tall. Leaf-sheaths and blades often papillate-hirsute, the blades sparsely so, to glabrous or glabrate. Inflorescence a panicle of racemes, these digitate, subdigitate, solitary or irregularly arranged along the axis. Spikelets 2-flowered, the lower floret a sterile lemma, pedicellate in groups of 2 or 3, unilateral, in 2 rows. Glumes very unequal, the first glume minute or wanting; second glume and sterile lemma similar. Fertile lemma firm-textured and somewhat pitted-striatulate.

- a. First glume present, minute.
  - b. Spikelets about 3 mm. long (2.5-3.5); rachis of inflorescence without hispid hairs. .... 1. *D. adscendens*.
  - b. Spikelets 2 mm. long; rachis with sparse, long, hispid hairs, especially at the nodes. .... 2. *D. horizontalis*.
- a. First glume absent.
  - c. Spikelets 1.5 mm. long, or less. .... 3. *D. violascens*.
  - c. Spikelets 2.5 mm. long.
    - d. Second glume obtuse, shorter than the dark brown fruit. ....  
..... 4. *D. leiantha*.
    - d. Second glume acute, longer than the pale fruit. ....  
..... 5. *D. lanuginosa*.

1. *Digitaria adscendens* (HBK.) Henr. in *Blumea*, 1: 92 (1934). Weedy annual, decumbent and spreading, the culms to 1 m. long but usually much shorter. Leaf-sheaths papillate-hirsute; leaf-blades to 1 cm. wide, pubescent to glabrous. Racemes to 10 (-15) cm. long, the rachis 0.5 mm. wide, with margins as wide as the central rib, digitate or in several whorls. First glume less than 0.5 mm. long; second glume about 1.5 mm. long, ciliate. Sterile lemma acute, 3-nerved, pubescent along the nerves but mostly between the lateral nerves and the margins. Fertile lemma about 3 mm. long, light in color and finely pitted. LA PAZ: LARECAJA: Hacienda Simaco, 1400 m., *Buchtien* 5318 (GH); NOR YUNGAS: Polo-Polo, near Coroico, 1100 m., *Buchtien* (in 1912) 444 (GH); Milliguaya, 1300 m., *Buchtien* (in



1917) 444 (GH). SANTA CRUZ: SARA: Río Surutú, 400 m., *Steinbach* 6839 (GH); Buenavista, 450 m., *Steinbach* 6848 (GH), 7057 (GH).

2. *D. horizontalis* Willd. Enum. Pl. 92 (1809). Annual. Leaf-sheaths usually papillate-hirsute; blades to 1 cm. wide, densely pubescent. Raceme-rachis almost without a margin, with scattered, long, hispid hairs, these prominent at the nodes. Spikelets 2 mm. long. First glume minute; second glume about 1 mm. long, subacute, ciliate on upper margin. Sterile lemma 2 mm. long, puberulent near the margin. Fertile lemma pale, acute, shorter than the sterile lemma. SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 6986 (GH).

3. *D. violascens* Link, Hort. Berol. 1: 229 (1927). Annual, decumbent, to 8 dm. tall. Leaf-sheaths usually glabrous; leaf-blades to 6 mm. wide, glabrous or pubescent. Racemes 2-5, digitate or subdigitate, the rachis-margins very narrow. Spikelets to 1.5 mm. long, puberulent or glabrous. First glume wanting; second glume about 1 mm. long. Sterile lemma as long as the spikelet. Fertile lemma dark-brown, shining. LA PAZ: LARECAJA: Hacienda Simaco, 1400 m., *Buchtien* 5335 (GH); NOR YUNGAS: Coripata, *Hitchcock* 22674 (GH).

4. *D. leiantha* (Hack.) Parodi in *Physis*, 7: 57 (1923). Perennial, to 1 m. tall, glabrous. Racemes stiff, erect. Spikelets 3 mm. long, glabrous. First glume absent; second glume obtuse, shorter than the spikelet. Sterile lemma as long as the spikelet. Fertile lemma acute, shining, chestnut-brown. SANTA CRUZ: VALLEGRANDE: Coripata, *Herzog* 1763 (US).

5. *D. lanuginosa* (Nees) Henr. in *Meded. Rijks Herb. Leiden*, no. 61: 5 (1930). Perennial, to 1 m. tall. Leaf-sheaths and blades pubescent. Racemes to 10 cm. long. Spikelets 2.5 mm. long, pubescent on the nerves, acuminate. First glume absent; second glume and sterile lemma as long as the spikelet. Fertile glume shorter than the sterile lemma and glume, pale in color. SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 6849 (GH), 6877 (GH).

#### 74. *Thrasya* HBK.

*Thrasya campylostachya* (Hack.) Chase in *Proc. Biol. Soc. Wash.* 24: 115 (1911). Perennial, to about 5 dm. high. Leaf-sheaths densely ciliate, the linear blades to 5 mm. wide, sparsely ciliate and densely puberulent. Inflorescence solitary, terminal or axillary racemes to 9 cm. long, the base often partly sheathed by a stem-leaf, the rachis rather broadly winged and partly concealing the bases of the paired, shortly pedicellate spikelets. Spikelets about 3 mm. long, unilateral, disarticulation below the glumes, 2-flowered, the lower a sterile lemma. First glume usually hyaline, 1 mm. long or less, the second glume about 2.5 mm. long, about 5-nerved, the back rounded, often puberulent along the nerves, the apex shortly penicillate. Lemma about 2.5 mm. long, usually slightly shorter than the second glume, indurate, finely striate, the apex shortly penicillate. Palea shorter than the



lemma, indurate, striate, the 2 keels thick, rounded and shining. LA PAZ: NOR YUNGAS: San José, 1500 m., *Hitchcock* 22733 (GH); Coripata, *Hitchcock* 22694 (GH).

### 75. *Pseudechinolaena* Stapf

*Pseudechinolaena polystachya* (HBK.) Stapf in Prain, Fl. Trop. Afr. 9: 495 (1919). Sprawling annual, in moist habitats, rooting at the nodes, the fruiting culms to 5 dm. high. Leaf-sheaths densely pilose, the lance-ovate blades to 6 cm. long, sparsely pilose above and beneath. Inflorescence axillary or terminal, the racemes solitary or arranged in a lax panicle, the rachis, branches and pedicels scabridulous-puberulent, the individual racemes 2-5 cm. long. Spikelets 2-flowered, the lower floret sterile or staminate, the upper perfect, about 4 mm. long, disarticulation below the glumes. First glume about 3 mm. long, 5-nerved, rather sparsely short-hispid; second glume 4 mm. long, several-nerved, short-hispid when young, ventricose and uncinately spiny at maturity. Sterile lemma firm, minutely papillate, slightly shorter than the second glume, its palea nearly as long, but much narrower. Fertile lemma about 2 mm. long, shining, indurate, the narrow indurate palea about as long. LA PAZ: LARECAJA: Hacienda Simaco, 1400 m., *Buchtien* 5320 (GH); Polo-Polo, 1100 m., *Buchtien* 265 (GH); Milluguaya, 1300 m., *Buchtien* 265 (GH). COCHABAMBA: CHAPARE: Locotal, 1500 m., *Steinbach* 9054 (GH), 9070 bis (GH).

### 76. *Rhynchelytrum* Nees

*Rhynchelytrum repens* (Willd.) C. E. Hubb. in Kew Bull. 1934: 110 (1934). *Tricholaena rosea* of the Catalogue. Annual (or sometimes perennial?), often decumbent at the base, the culms to 1 m. tall. Leaf-sheaths glabrous to sparsely papillate-hirsute; leaf-blades flat, to 2-7 mm. wide, glabrous. Inflorescence an open terminal panicle, to 15 cm. long, the axis glabrous below to puberulent above, branches puberulent around the nodes, pedicels glabrous. Spikelets 2-flowered, the lower floret a sterile or staminate lemma, about 4-5 mm. long (excluding hairs), disarticulation below the glumes. First glume to 1.5 mm. long, extremely obtuse or truncate, silky-villous; second glume to 4 mm. long, apically obtuse and bidentate, with a 1.5 mm. awn arising from the base of the sinus, long-ciliate, densely silky-villous (at least below), the hairs exceeding the spikelet by 4-5 mm. Sterile lemma as long as second glume, bidentate, shortly awned, silky-villous. Fertile lemma 2.5-3 mm. long, glabrous, rather shining, obtuse, palea similar and nearly as long, but narrower. COCHABAMBA: CERCADO: about 5 km. southeast of Cochabamba, 2800 m., *Eyerdam* 24918 (GH).



The panicle of this ornamental grass varies in color from white and gray to pale or deep rosy-purple.

### 77. *Mesosetum* Steud.

See Swallen in *Brittonia*, 2: 363-392 (1937).

*Mesosetum cayennense* Steud. Syn. Gram. 118 (1854). Perennial, caespitose, 3-12 dm. high. Leaf-sheaths pilose, ciliate, the flat blades to 5 mm. wide, papillose-pilose above and beneath. Inflorescence a solitary terminal raceme to 20 cm. long, the spikelets solitary, unilateral in 2 rows on the rachis. Spikelets 4-5 mm. long, 2-flowered, the lower floret a sterile lemma, or sometimes staminate, the upper floret perfect, disarticulation below the glumes. Glumes unequal, the first to 3 mm. long, truncate, the apex somewhat erose, the margins appressed-pilose below with a tuft of long hairs on each side at the middle, the back toward the rachis; second glume to 5 mm. long, the margins appressed-pilose on the lower half, a tuft of hairs on each side at the middle, and a tuft of long hairs on each margin well below the erose or bidentate apex. Sterile lemma somewhat shorter than the second glume, a tuft of long hairs on each margin at the middle, a few hairs at the base. Fertile lemma smooth, shining, about 3 mm. long. LA PAZ: CAUPOLICÁN: Ixiamas, *White* (M. E.) 2318 (Swallen).

### 78. *Eriochloa* HBK.

Erect perennials, 2 dm. to 1 m. tall. Inflorescence a terminal panicle of 2-many somewhat distant racemes. Spikelets short-pedicellate, unilateral in 2 rows, 2-flowered, the lower floret a sterile lemma, the first glume a minute sheath adnate to the first rachilla-joint as a thickened callus; second glume and sterile lemma similar in appearance and size, the glume sometimes awned; fertile lemma indurate, finely papillate-rugulose, mucronate or awned or merely penicillate.

Pedicels pilose, with an apical ring of long hairs; leaf-blades narrow

(to 4 mm.); racemes 2 (-3). ..... 1. *E. distachya*.

Pedicels puberulent, lacking an apical ring of long hairs; leaf-blades to 1.5 cm. wide; racemes numerous. .... 2. *E. punctata*.

1. *Eriochloa distachya* HBK. Nov. Gen. & Sp. 1: 95 (1816). Plants 2-4 dm. tall, branched, the nodes pubescent, leaves glabrous, blades to 4 mm. wide. Inflorescence of 2, rarely 3, racemes 1-2 cm. long; main axis, raceme-axes and pedicels pilose to pilose-hispid, the pedicels with an apical ring of long hairs. Spikelets about 4 mm. long (excluding the awn). Second glume and sterile lemma pilose, acute, the glume sometimes awned. Fertile lemma 2.5-3 mm. long, the apex penicillate. SANTA CRUZ: SARA: Río Dolores, *Steinbach* 1940 (GH).



2. *E. punctata* (L.) Desv. ex Hamilton, Prodr. Pl. Ind. Occ. 5 (1825). Plants to 1 m. or more in height, basally decumbent, branched, nodes puberulent, leaves glabrous, the blades flat, to 1.5 cm. wide. Inflorescence of numerous racemes mostly over 2 cm. long; main axis and raceme-axes pilose, pedicels puberulent and without an apical ring of long hairs. Spikelets about 4 mm. long. Second glume and sterile lemma sparsely pilose, acute. Fertile lemma over 2 mm. long, the apex not penicillate but awned, the awn about 1 mm. long. LA PAZ: NOR YUNGAS: Coripata, Hacienda El Choro, 1700 m., *Buchtien* 8040 (GH); SUR YUNGAS: Chulumani, 1600 m., *Hitchcock* 22666 (GH).

### 79. *Brachiaria* (Trin.) Griseb.

*Brachiaria plantaginea* (Link) Hitchc. in Contrib. U. S. Nat. Herb. 12: 212 (1909). Annual, decumbent, rooting at the nodes, culms to 5 dm. high. Leaves glabrous, the lance-ovate blades to 1.5 cm. wide. Inflorescence a series of terminal, unilateral racemes to 7 cm. long, the solitary spikelets in 2 rows along the rachis. Spikelets 2-flowered, the lower floret sterile or staminate, the upper floret perfect, to 5 mm. long, disarticulation below the glumes. Glumes subequal to unequal; first glume about 2 mm. long, but often longer, completely surrounding the base of the second glume, rather thin-textured, about 7-nerved, its back toward the rachis, second glume to 5 mm. long, firmer-textured, about 7-nerved, the apex sometimes mucronulate. Sterile lemma as long as the second glume and similar in appearance. Fertile lemma about 3 mm. long, somewhat indurate, densely papillate-striate. Palea similar to fertile lemma, enfolded by the margins of the latter. LA PAZ: NOR YUNGAS: Polo-Polo, 1100 m., *Buchtien* 443 (GH); Milluguaya, 1300 m., *Buchtien* 158 (GH); Coripata, 1700 m., *Buchtien* 8041 (GH).

### 80. *Axonopus* Beauv.

See Black in *Advancing Frontiers of Plant Science*, vol. 5 (1963).

Perennial (1 Bolivian species annual), mostly tall. Leaf-blades involute or flat or folded. Inflorescence a panicle or subpaniculate, of few to many racemes conjugate, digitate, or distant along a common axis. Spikelets solitary, unilateral in 2 rows along the rachis, disarticulation below the glumes, 2-flowered, the lower floret a sterile lemma, the perfect floret above it. First glume absent; second glume and sterile lemma more or less alike in size and appearance; second glume and fertile lemma turned away from the rachis. Fertile lemma indurate, whitish or yellowish to dark brown, the margins curved over the edge of the similar palea but not enclosing it.

a. Rachis hispid or pilose.

b. Rachis-hairs not hispid nor papillate-based. .... 10. *A. pilosus*.

b. Rachis-hairs hispid, papillate-based.



- c. Hairs not yellow nor golden-brown. .... 14. *A. elegantulus*.
- c. Hairs yellow to golden-brown.
  - d. Spikelets in cupular cavities along the rachis. .... 17. *A. chrysolepharis*.
  - d. Spikelets not in cupular cavities.
    - e. Rachis not obviously flexuose; glume with papillate-hispid hairs on the nerves. .... 16. *A. Herzogii*.
    - e. Rachis obviously flexuose; glume without papillate-hispid hairs.
      - f. Glume and sterile lemma glabrous, occasionally very slightly puberulent. .... 19. *A. chrysites*.
      - f. Glume and sterile lemma shortly and finely pubescent. .... 18. *A. exasperatus*.
- a. Rachis neither hispid nor ciliate.
  - g. Spikelets obviously hirsute. .... 2. *A. marginatus*.
  - g. Spikelets not hirsute but glabrous to sparsely puberulent.
    - h. Leaves papillate-pilose, at least when young.
      - i. Leaf-blades to 4 mm. wide. .... 4. *A. hirsutus*.
      - i. Leaf-blades to 3 cm. wide. .... 12. *A. scoparius*.
    - h. Leaves essentially glabrous, at least on upper surface.
      - j. Culm-nodes not glabrous.
        - k. Racemes 2-4 in panicle; if 4, the upper 2 conjugate. .... 6a. *A. compressus* var. *macropodius*.
        - k. Racemes much more numerous in panicle.
          - l. Racemes up to 20; distant and divergent on the common axis. .... 13. *A. iridifolius*.
          - l. Racemes more than 20; approximate and ascending on the common axis.
            - m. Spikelets about 2 mm. long; leaf-blades subpetiolate at base. .... 7. *A. eminens* var. *bolivianus*.
            - m. Spikelets about 2.5 (-3) mm. long; blades not subpetiolate. .... 8. *A. barbigerus*.
      - j. Culm-nodes glabrous.
        - n. Leaf-blades abruptly rounded at base.
          - o. Spikelets to 1.6 mm. long. .... 15. *A. capillaris*.
          - o. Spikelets to 2.4 mm. long. .... 6. *A. compressus*.
        - n. Leaf-blades not abruptly rounded at base.
          - p. Blades tightly involute, appearing terete. .... 9. *A. siccus*.
          - p. Blades flat or folded.
            - q. Blades acuminate, acute. .... 11. *A. andinus*.
            - q. Blades not acuminate, obtuse.
              - r. Culms mostly 2 dm. tall. .... 5. *A. fissifolius*.
              - r. Culms about 6 dm. tall.
                - s. Glumes pilose on the nerves, especially at base and apex. .... 1. *A. Purpusii*.



s. Glumes sparsely puberulent to glabrous. ....  
 ..... 3. *A. affinis*.

1. ***Axonopus Purpusii*** (Mez) Chase in Journ. Wash. Acad. Sci. 17: 144 (1927). Perennial, to 7 dm. tall, culm-nodes usually glabrous. Leaf-sheaths ciliate, at least near summit; blades flat or folded, to 4 mm. wide, shorter than inflorescence, glabrous or sparsely papillate-pubescent, ciliate at the base. Inflorescence of 2-7 erect racemes, to 7 cm. long, the rachis scabridulous, flexuose, the pedicels sometimes densely hairy. Spikelets to 2.2 mm. long, ovoid to oblong, greenish or brownish-purple. Glume and sterile lemma equal, mostly 2-nerved, the mid-nerve absent, pilose on the nerves, at least at base and apex. Fertile lemma a little shorter than or equaling the spikelet, yellowish, glabrous or minutely penicillate at apex. SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 7060 bis, in part (GH).

The description given is based in part on an isotype in the Gray Herbarium, *Purpus* 2450.

2. ***A. marginatus*** (Trin.) Chase in Contrib. U. S. Nat. Herb. 17: 226 (1913). Perennial, to 8.5 dm. high, sometimes stoloniferous or rhizomatous. Culm-nodes pubescent or barbate, sometimes glabrous. Leaf-sheaths glabrous, or pilose near the apex; blades 2-4 mm. wide, to 30 cm. long, flat or folded, ciliate at base, glabrous above, pilose or sparsely pilose beneath, the obtusely acuminate apex naviculate. Inflorescence of up to 13 ascending racemes to 15 cm. long, the rachis scabrid, pedicels pubescent, especially on the margins. Spikelets 2-3 mm. long, ellipsoid to oblong. Glume and sterile lemma equal, 2-4-nerved, mid-nerve absent, densely hairy along (but seldom on) the nerves, the hairs dark purple to silvery, becoming light to dark brown. Fertile lemma about equal to sterile lemma, white or nearly so, the apex penicillate. LA PAZ: LARECAJA: Hacienda Casana, 1600 m., *Buchtien* 7118 (US).

3. ***A. affinis*** Chase in Journ. Wash. Acad. Sci. 28: 180 (1938). Caespitose perennial, to 6.5 dm. tall. Culms erect or geniculate, the nodes glabrous. Leaf-sheaths ciliate toward apex, otherwise glabrous; blades folded or flat, the base sometimes sparsely pilose, otherwise glabrous. Inflorescences terminal the panicle of 2-7 racemes to about 8 cm. long, rachis glabrous or slightly scabridulous, straight to flexuose. Spikelet to 2.1 mm. long, elliptic to ovate. Glume and sterile lemma equal, 2-4-nerved, midrib absent, lateral nerves sparsely pubescent to glabrous. Fertile lemma equal to or somewhat shorter than the sterile lemma, pale yellow, glabrous or the apex somewhat penicillate. SANTA CRUZ: SARA: Buenavista, 450-500 m., *Steinbach* 5183 (GH), 6724 (GH), 6847 (GH).

4. ***A. hirsutus*** G. A. Black in Advanc. Front. Pl. Sci. 5: 55 (1963). Perennial, the culms to 2.5 dm. tall, nodes densely pilose. Leaf-sheaths carinate, densely ciliate, densely pilose at the apex; blades to 20 cm. long, 4 mm. wide, flat, linear, attenuate at the apex, densely papillate-



pilose, ultimately glabrescent. Inflorescence terminal, solitary, of 4-5 subdigitate racemes to 8 cm. long, rachis scabrous, flexuose. Spikelet to 1.6 mm. long, ovate to oblong-elliptic. Glume and sterile lemma equal, 2-4-nerved, sparsely pubescent along the inner nerves. Fertile lemma slightly shorter, stramineous to brown, shining, glabrous. SANTA CRUZ: SARA: Matacú [Motacú] — Portachuelo, *Steinbach* 1979 (GH; probable isotype).

5. *A. fissifolius* (Raddi) Kuhl. in Comm. Linh. Telegr. Estrat. Matto Grosso Amazonas, Publ. 67, Anexo 5, Bot. 11: 87 (1922). Perennial, to 4.5 dm. tall (usually about 2 dm.), nodes glabrous. Leaf-sheaths ciliate at the apex; blades to 4 mm. wide, usually glabrous, ciliate at the base, obtuse. Inflorescences mostly terminal panicles of 1-3 racemes to 7 cm. long (occasionally to 10 cm.); rachis glabrous, straight to flexuose. Spikelet to 2.1 mm. long, ovate to elliptic. Glumes and sterile lemma equal, 2-4-nerved, sparsely pubescent on the nerves, stramineous. Fertile lemma as long as the sterile, light yellow to whitish, glabrous or minutely penicillate. LA PAZ: LARECAJA: Hacienda Simaco, 1400 m., *Buchtien* 5326 (GH); NOR YUNGAS: Polo-Polo, 1100 m., *Buchtien* 267 (GH); Coroico, 1560 m., *Hitchcock* 22716 (GH); SUR YUNGAS: La Florida, 1840 m., *Hitchcock* 22625 (GH). SANTA CRUZ: SARA: Buenavista, Dolores, *Steinbach* 1908 (GH).

6. *A. compressus* (Swartz) Beauv. Ess. Agrost. 154 (1812). Perennial, stoloniferous. Culms to 8 dm. high, but usually to 4.5 dm., nodes glabrous to pubescent. Leaf-sheaths ciliate, pubescent near the apex or glabrous; blades flat, to 2 cm. wide, lance-linear to ovate, usually ciliate, sometimes the upper surface pubescent to pilose. Inflorescences terminal or terminal and lateral, the panicle of 2-5 racemes to 13 cm. long, the uppermost conjugate; rachis scabrid to pilose, flexuose or nearly straight. Spikelet to 3 mm. long on pedicels up to 1 mm. long. Glume and sterile lemma equal, 2-5-nerved, sparsely pubescent along the outermost nerves, or glabrous, stramineous to purple. Fertile lemma to 1.8 mm. long, glabrous or shortly penicillate. SANTA CRUZ: SARA: Buenavista, 500 m., *Steinbach* 5159 (GH); Dolores, *Steinbach* 1907 (GH).

6a. *A. compressus* var. *macropodius* (Steud.) G. A. Black in *Advanc. Front. Pl. Sci.* 5: 82 (1963). Perennial, to 6 dm. high, culm-nodes pilose. Leaf-sheaths glabrous except along the margins and at the apex; blades to 2 dm. long and 12 mm. wide, elliptic, ciliate near the base; petiolately narrowed at the base, apex obtuse. Panicle of 2-4 racemes, these often conjugate, rachis and pedicels glabrous. Spikelet to 2.5 mm. long. Second glume and sterile lemma 2-4-nerved, very sparsely short-pilose along the nerves, especially at the base. Fertile lemma about 0.75 mm. shorter than the sterile lemma, whitish, more or less striate or papillate-striate. COCHABAMBA: CHAPARE: Antahuacana, Espíritu Santo, 750 m., *Buchtien* 2505 (US).



7. *A. eminens* var. *bolivianus* G. A. Black in *Advanc. Front. Pl. Sci.* 5: 93 (1963). Perennial, robust, to 2.5 m. tall (*vide* Steinbach), the culm-nodes densely barbate. Leaf-sheaths densely ciliate and pilose near the apex; blades involute, subpetiolate at the base, becoming flat, to 1 cm. wide, upper surface pilose near the base, the apex long-acuminate to pungent. Panicle terminal, to 35 cm. long, of numerous approximate racemes (usually at least 50) to 18 cm. long; rachis scabrous. Spikelet to 2 mm. long, ovoid; glume and sterile lemma equal, 5-nerved, glabrous or sparsely pubescent. Fertile lemma shorter than the sterile, white, glabrous to penicillate. SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 6976 (GH).
8. *A. barbigerus* (Kunth) Hitchc. in *Contrib. U. S. Nat. Herb.* 24: 433 (1927). Stout perennial, the culms to 1-2 m. tall, nodes usually densely pilose but occasionally glabrous. Leaf-sheaths ciliate at the apex, the base sometimes pubescent; blades to 9 dm. long and 6 mm. wide, long-attenuate at the apex, involute or folded at the base. Inflorescences terminal, usually solitary, of 10-50 or more ascending racemes to 20-30 cm. long, rachis scabrous with occasional long hairs. Spikelet about 2.5 mm. long (but occasionally to 3.1 mm.). Glume and sterile lemma equal, 5-nerved, glabrous or sparsely pubescent between the nerves. Fertile lemma about equaling the sterile, or shorter, pale yellow to white, glabrous or penicillate. LA PAZ: [province unknown]: Puente Villa, *Cárdenas* 3608 (GH). SANTA CRUZ: SARA: Buenavista, 450-500 m., *Steinbach* 1920 (GH), 5377 (GH).
9. *A. siccus* (Nees) Kuhl. in *Comm. Linh. Telegr. Estrat. Matto Grosso Amazonas, Publ.* 67, Annexo 5, *Bot.* 11: 87 (1922). Slender perennial, the culms mostly to 9 dm. tall but occasionally much taller, the nodes usually glabrous. Leaf-sheaths ciliate, at least near the apex; blades tightly involute, appearing terete, the apex slender and filamentous. Panicles terminal, of 4-30 racemes to 15 cm. long, rachis scabrid. Spikelets to 2.1 mm. long. Glumes and sterile lemma equal, 5-nerved, glabrous, or puberulent between the nerves. Fertile lemma equalling the sterile, white to stramineous, glabrous or penicillate. SANTA CRUZ: VALLEGRANDE: Samaipata, *Herzog* 1709 (US). TARIJA: O'CONNOR: Narvaez, 2700 m., *Cárdenas* 4935 (US).
10. *A. pilosus* G. A. Black in *Advanc. Front. Pl. Sci.* 5: 100 (1963). Perennial, the culms to 5 dm. tall with pubescent nodes. Leaf-sheaths somewhat pilose, especially near the apex, the hairs tufted at the base of the blade; blades to 2.5 mm. wide, folded, ciliate at the base, the upper surface pilose, the apex very long-acuminate or filamentous. Inflorescence a solitary terminal panicle of many (to 25) racemes to 10 cm. long; rachis flexuose, densely pilose, the hairs not hispid nor yellow-brown, mostly aggregated around the short pedicels. Spikelets to 2.7 mm. long, long-ellipsoid, often purplish. Glume and sterile lemma equal, 5-nerved, glabrous to sparsely pubescent. Fertile lemma



greenish to white, penicillate. TARIJA: MENDEZ: Tucumilla, 2600 m., *Fiebrig* 2782 (GH; type-number).

11. *A. andinus* G. A. Black in *Advanc. Front. Pl. Sci.* 5: 111 (1963). Perennial, to 1 m. tall, culm-nodes glabrous. Leaf-sheaths somewhat short-pilose at the apex, otherwise glabrous; blades long, to 5 mm. wide, loosely folded or flat, glabrous or with a few hairs on the upper surface at the base. Panicles of 5-7 racemes to 10 cm. long; rachis and pedicels scabrid on the angles. Spikelets about 2.5 mm. long, lanceolate. Second glume and sterile lemma equal, often purplish (at least on the type), 2-4-nerved, the nerves short-pilose. Fertile lemma shorter than the sterile, yellowish-white, obscurely striatulate, the acute apex penicillate. LA PAZ: LARECAJA: Hacienda Simaco, 1400 m., *Buchtien* 5328 (US; type).

12. *A. scoparius* (Flügge) Kuhl. in *Comm. Linh. Telegr. Estrat. Matto Grosso Amazonas*, Publ. 67, Anexo 5, *Bot.* 11: 45 (1922). *Paspalum tripinnatum* Mez in *Fedde, Rep. Sp. Nov.* 15: 64 (1917). Stout perennial, the culms to 1.5 m. tall, nodes glabrous. Leaf-sheaths glabrous; blades to 5 dm. long and 3 cm. wide, the apex obtuse, the upper surface papillate-pilose. Inflorescences terminal (sometimes axillary as well), of few to 100 racemes to 20 cm. long; rachis scabrid and sometimes sparsely short-pilose. Spikelets to 2.4 mm. long. Glume and sterile lemma equal, usually 5-nerved, short-pubescent between the nerves. Fertile lemma mostly shorter than the sterile, pale yellow, glabrous or penicillate. LA PAZ: LARECAJA: Hacienda Simaco, 1400 m., *Buchtien* 5324 (GH). COCHABAMBA: CHAPARE: Locotal, 1500 m., *Steinbach* 9093 in part (GH).

The Steinbach specimen is only an inflorescence-fragment and the present attribution may be an error.

13. *A. iridifolius* (Poepp.) G. A. Black in *Advanc. Front. Pl. Sci.* 5: 125 (1963). Perennial, to 1 m. tall, the culm-nodes densely pubescent. Leaf-sheaths scabrid, carinate, pubescent to long-pilose at the apex; blades flat, to 1.9 cm. wide, obtuse, upper surface scabrid or strigose at base. Inflorescence a terminal panicle of 6-20 distant racemes to 18 cm. long; rachis somewhat flexuose, scabrid. Spikelets to 3 mm. long, greenish to purple. Glume and sterile lemma equal, 4-5-nerved, often puberulent between the nerves. Fertile lemma shorter than the sterile, stramineous, the apex penicillate. LA PAZ: NOR YUNGAS: Polo-Polo, 1100 m., *Buchtien* 448 (GH).

14. *A. elegantulus* (Presl) Hitchc. in *Contrib. U. S. Nat. Herb.* 24: 433 (1927). Perennial, the culms to 7.5 dm. tall, the nodes glabrous. Leaf-sheaths papillate-pilose to glabrous, papillate-ciliate; blades folded at base, flat above, to 25 cm. long and 5 mm. wide, long-attenuate, papillate-pilose to glabrous. Inflorescence terminal, of up to 12 subdigitate racemes to 10 cm. long; rachis ciliate, with few to no hairs immediately below the spikelets, hairs papillate-based but neither hispid nor golden-brown. Spikelets to 2.5 mm. long, greenish



to purple. Glume and sterile lemma equal, 2-3-nerved, glabrous. Fertile lemma sometimes slightly longer than the sterile, glabrous, shiny brown. LA PAZ: LARECAJA: San Carlos, Mapiri, *Buchtien s. n.* (Black). SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 7060 (at least as to GH sheet).

15. *A. capillaris* (Lam.) Chase in Proc. Biol. Soc. Wash. 24: 133 (1911). Lax annual, to 7.5 dm. high, nodes glabrous, the lowest sometimes rooting, culms geniculate. Leaf-sheaths ciliate; blades flat, to 8 mm. wide, lanceolate, acuminate, the edges undulate, abruptly rounded and more or less clasping at the base, pilose at the base, the main portion of the blade glabrous or pubescent. Inflorescence terminal, of 2-6 paired or subdigitate racemes to 8 cm. long; rachis and peduncles capillary, the rachis markedly flexuose and scabridulous. Spikelets to 1.6 mm. long, sessile, ellipsoid, obtuse to acute. Sterile lemma and glume equal, with 2-4 inconspicuous nerves, glabrous to sparsely pubescent. Fertile lemma shining, brown, glabrous. LA PAZ: LARECAJA: Mapiri, 1600 m., *Rusby* 241 (GH); Hacienda Simaco, 1400 m., *Buchtien* 5327 (GH); SUR YUNGAS: Chulumani, 1600 m., *Hitchcock* 22657 (GH). SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 6879 (GH).

16. *A. Herzogii* (Hack.) Hitchc. in Contrib. U. S. Nat. Herb. 24: 431 (1927). Perennial, to 8 dm. tall, the culm-nodes glabrous. Leaf-sheaths glabrous; blades folded, to 15 cm. long and 3 mm. wide, papillate-ciliate near the base. Panicle of 2-7 subdigitate racemes to 10 cm. long, axis pilose, rachis papillate-ciliate, the hairs yellowish- to golden-brown, long. Spikelet to 2.5 mm. long, lanceolate or lance-ovate, purplish, the pedicels minute. Second glume and sterile lemma equal, 5-nerved, the glume papillate-hispid on the nerves, the sterile lemma with shorter and finer white hairs between the nerves. Fertile lemma nearly as long as the sterile, rather dark brown, obscurely, if at all, striatulate, the acute apex penicillate. SANTA CRUZ: CHIQUITOS: Cerro San Miserate, Santiago, *Herzog* 866 (US; type-number).

17. *A. chrysolepharis* (Lag.) Chase in Proc. Biol. Soc. Wash. 24: 134 (1911). Annual or perennial, to 10 dm. tall, the culm-nodes glabrous or pubescent. Leaf-sheaths glabrous to densely pubescent, often hispid-ciliate, especially near the apex; blades to 1.5 cm. wide, usually narrower, pilose to glabrous, acuminate. Inflorescence terminal or lateral, of 2-10 racemes to 4 cm. long, subdigitate; rachis not flexuose, the margins and center densely papillate-hispid, the golden or golden-brown hairs dense, to 3-4 mm. long, basally fused, apex often without spikelets. Spikelets to 1.5 mm. long, fitting into cavities in the rachis, ovoid, obtuse. Glume and sterile lemma equal, glabrous, 2-nerved, very thin. Fertile lemma purple or brown, glabrous, obtuse to sub-acute. BENI: YACUMA: Reyes, *Rusby* 216 (Black). LA PAZ: NOR YUNGAS: Hacienda Anacuri, *Holway* 708 (Black).

18. *A. exasperatus* (Nees) G. A. Black in Advanc. Front. Pl. Sci.



5: 168 (1963). Straggling perennial to 8 dm. tall, culms often branched at the base, nodes glabrous. Leaf-sheaths glabrous; blades mostly less than 1 dm. long, to 5 mm. wide, with a few stiff hairs near the base, the apex long-acuminate. Inflorescences terminal, 1-2, of 2-7 racemes to 9 cm. long; rachis somewhat flexuose, papillate-hispid, the hairs golden-brown, with a dense tuft of hairs subtending each spikelet, mostly more than 10 hairs in a tuft. Spikelets to 1.5 mm. long, green to purple, ovoid to obovoid, obtuse to subacute. Glume and sterile lemma equal, the 2-4 nerves obscure, short-pubescent, usually sparsely so, or the hairs in 2 rows. Fertile lemma shining brown, glabrous. SANTA CRUZ: SARA: lomas arenosas, 450 m., [Buenavista?], *Steinbach* 1815 (GH).

19. *A. chrysites* (Steud.) Kuhl. in *Comm. Linh. Telegr. Estrat. Matto Grosse Amazonas*, Publ. 67, Anexo 5, Bot. 11: 88 (1922). *A. aureus* of the Catalogue, at least in part. Perennial, straggling to erect, to 7.5 dm. tall, culm-nodes glabrous. Leaves glabrous except for a few hispid hairs at base of upper surface of blade, the blades to 7 mm. wide, attenuate. Inflorescence terminal, 1-2 panicles, the racemes to 8 cm. long; rachis somewhat flexuose, long-hispid on the margins and mid-ridge, with a cluster of hairs to 2.5 mm. long below each spikelet, the hairs yellow- or golden-brown. Spikelets to 1.5 mm. long, obovoid, obtuse, purple to fulvous. Glume and sterile lemma equal, the 2-4 nerves obscure (or absent), glabrous or slightly pubescent. Fertile lemma shining brown, glabrous. SANTA CRUZ: SARA: Buenavista, 450-500 m., *Steinbach* 5426 (GH), 6948 (GH).

### 81. *Paspalum* L.

See Chase in *Contrib. U. S. Nat. Herb.* 28: 1-310 (1929).

Annual or perennial. Leaf-blades flat or folded at the base. Panicle of 1 to many racemes on a common axis. Rachis of racemes narrow to very broadly winged, sometimes prolonged beyond the ultimate spikelets. Spikelets glabrous or variably pubescent, sessile, sub-sessile or pedicellate, solitary or paired, unilateral on the rachis, often biconvex or planoconvex, disarticulation below the glumes, 2-flowered, the lower floret a sterile lemma, the upper perfect. First glume usually absent, present in some species and occasionally present in others. Second glume usually present, absent in a few species, similar to the sterile lemma in size and appearance. Fertile lemma usually somewhat indurate, often shining, usually somewhat striate or striate-papillate.

a. Rachis prolonged beyond uppermost spikelet.

b. Spikelets glabrous.

c. Glumes absent.

d. Spikelets over 2 mm. long. .... 4. *P. candidum*.

d. Spikelets less than 2 mm. long.



- e. Culms dark; leaf-sheaths glabrous or sparsely pilose along margins. .... 5. *P. depauperatum*.
- e. Culms light; leaf-sheaths densely long-pilose. .... 6. *P. lineispatha*.
- c. Second glume present.
  - f. Spikelets less than 2 mm. long; rachis less than 2 mm. wide.
    - g. Plants over 10 cm. high; leaves sparsely pilose to glabrous. .... 1. *P. penicillatum*.
    - g. Plants less than 10 cm. high; leaves densely pilose. .... 2. *P. pygmaeum*.
  - f. Spikelets over 2 mm. long; rachis at least 2 mm. wide. .... 3. *P. prostratum*.
- b. Spikelets not glabrous.
  - h. Rachis very broadly winged.
    - i. Leaf-blades flat, 3-8 mm. wide; racemes usually more than 1. .... 7. *P. Ceresia*.
    - i. Leaf-blades very narrow, involute, pilose; racemes rarely more than 1. .... 8. *P. stellatum*.
  - h. Rachis very narrowly winged. .... 39. *P. saccharoides*.
- a. Rachis not prolonged beyond uppermost spikelet.
  - j. Spikelets glabrous.
    - k. Glumes absent.
      - l. Rachis puberulent; spikelets mostly over 2 mm. long. .... 38. *P. boliviense*.
      - l. Rachis glabrous, with a few long cilia; spikelets mostly less than 2 mm. long. .... 37. *P. malacophyllum*.
    - k. Second glume present.
      - m. Rachis coarsely long-ciliate.
        - n. Rachis sparsely ciliate, mainly puberulent-scabrid; spikelets mostly over 2 mm. long. .... 32. *P. millegrana*.
        - n. Rachis densely ciliate; spikelets mostly less than 2 mm. long. .... 33. *P. densum*.
      - m. Rachis not coarsely long-ciliate.
        - o. Racemes not conjugate.
          - p. First glume present on 1 or both of the paired spikelets.
            - q. Spikelets about 1.5 mm. long. .... 14. *P. decumbens*.
            - q. Spikelets about 2.5 mm. long. .... 35. *P. pilosum*.
          - p. First glume absent or rarely present on 1 spikelet of the pair. .... 21. *P. inaequivalve*.
        - o. Racemes conjugate.
          - r. Spikelets about 1 mm. long. .... 20. *P. pictum*.
          - r. Spikelets 2-3 mm. long.
            - s. Spikelets 2.5-3 mm. long. .... 25. *P. notatum*.
            - s. Spikelets 2-2.5 mm. long. .... 26. *P. minus*.
  - j. Spikelets not glabrous.
    - t. Rachis coarsely scabrid-ciliate. .... 30. *P. virgatum*.



- t. Rachis not coarsely scabrid-ciliate.
- u. Spikelet-hairs swollen-globose. .... 19. *P. multicaule*.
- u. Spikelet-hairs not swollen-globose.
- v. Spikelets with long silky hairs.
- w. Racemes neither solitary nor conjugate.
- x. Spikelets to 2.5 mm. long. .... 24. *P. Urvillei*.
- x. Spikelets 3.5 mm. long, or more.
- y. Sterile lemma glabrous.
- z. Racemes 2-5; leaf-blades stiffly pilose (at least on margins). .... 9. *P. Humboldtianum*.
- z. Racemes 8-16; leaf-blades glabrous or nearly so. .... 11. *P. Buchtienii*.
- y. Sterile lemma not glabrous.
- aa. Leaf-blades ciliate at base, otherwise glabrous. .... 23. *P. dilatatum*.
- aa. Leaf-blades puberulent or pilose.
- bb. Blades puberulent on both surfaces. .... 12. *P. polyphyllum*.
- bb. Blades sparsely to densely pilose. .... 10. *P. erianthum*.
- w. Racemes solitary or conjugate.
- cc. Racemes solitary. .... 36. *P. Ekmanianum*.
- cc. Racemes conjugate. .... 22. *P. conjugatum*.
- v. Spikelets lacking long silky hairs.
- dd. Racemes conjugate (rarely a third raceme present below). .... 13. *P. distichum*.
- dd. Racemes not conjugate.
- ee. First glume present on 1 of the paired spikelets.
- ff. Plants to 8.5 dm. tall; second glume sometimes puberulent on the margin only. .... 15. *P. inconstans*.
- ff. Plants to 4.5 dm. tall; second glume obscurely puberulent or pubescent at the summit. .... 16. *P. lepidum*.
- ee. First glume lacking.
- gg. Spikelets 2 mm. or less in length.
- hh. Fruit dark brown. .... 27. *P. melanospermum*.
- hh. Fruit pale.
- ii. Sterile lemma pubescent. .. 17. *P. paniculatum*.
- ii. Sterile lemma glabrous. .... 18. *P. Juergensii*.
- gg. Spikelets over 2 mm. long.
- jj. Fruit pale.
- kk. Leaf-blades densely pubescent on both surfaces. .... 16. *P. lepidum*.
- kk. Leaf-blades glabrous, scabrous on margins. .... 34. *P. remotum*.



- jj. Fruit dark.
- ll. Sterile lemma transversely rugulose near base.  
..... 28. *P. plicatulum*.
- ll. Sterile lemma not rugulose.
- mm. Spikelets to 2.5 mm. long. ....  
..... 29. *P. collinum*.
- mm. Spikelets 2.7-3 mm. long. ....  
..... 31. *P. conspersum*.

1. ***Paspalum penicillatum*** Hook. f. in Trans. Linn. Soc. 20: 171 (1851). Annual, decumbent, to 4 dm. tall. Leaf-blades to 13 cm. long and 1.5 cm. wide, glabrous beneath, sparsely pilose above, ultimately glabrate and somewhat pilose-ciliate near the base. Panicle of several racemes, usually paired, to 3 cm. long, usually nearer 2 cm., the rachis of each raceme extended well beyond the uppermost spikelet, less than 2 mm. wide. Spikelets to 1.7 mm. long, glabrous, second glume present. Sterile lemma as long as spikelet, thin, several-veined. Fertile lemma dull white. LA PAZ: LARECAJA: Sorata, 2650-2800 m., *Mandon* 1250 (GH); Sorata, *Bang* 1310 (GH); Sorata, 2800 m., *Rusby* 240 (GH); NOR YUNGAS: Coripata, 1700 m., *Buchtien* 8050 (GH); SUR YUNGAS: La Florida, 1840 m., *Hitchcock* 22643 (GH).

2. ***P. pygmaeum*** Hack. in Fedde, Rep. Sp. Nov. 11: 18 (1912). *P. pygmaeum* var. *glabrescens* Hack. in Fedde, Rep. Sp. Nov. 11: 18 (1912). Matted, branched annual, culms to 1 dm. long, usually shorter. Leaf-sheaths rather densely pilose; blades short, usually to 3 cm. long, more sparsely pilose above and beneath. Panicles small, with 2-6 racemes 0.5-2 cm. long, the rachis less than 2 mm. wide, extended beyond the uppermost spikelet. Spikelets less than 2 mm. long, glabrous. Second glume present, 3-nerved, sterile lemma similar, the 3 nerves in a central position. Fertile lemma smooth, not highly shining. LA PAZ: MURILLO: La Paz, 3900 m., *Buchtien* 2490 (GH; type-number of *P. pygmaeum* var. *glabrescens*); Talca Chuquiaguillo, *Bang* 808 (GH). COCHABAMBA: CHAPARE: La Aduana, 3100 m., *Steinbach* 9579 (GH).

3. ***P. prostratum*** Scribn. & Merr. in U. S. Dept. Agric. Div. Agrost. Bull. no. 24: 9 (1900). Annual, decumbent or prostrate, the culms to 3 dm. long, often rooting at the nodes. Leaf-sheaths sparsely pilose-ciliate or glabrous to densely pilose; blades to 8 cm. long and 1.2 cm. wide, papillate-pilose above and beneath. Panicle of 3-12 solitary to somewhat fasciculate racemes 1-3 cm. long, the rachis about 2.5 mm. wide, extended beyond the uppermost spikelet. Spikelet to 2.2 mm. long, glabrous, second glume present, sterile lemma similar, 3-nerved. Fertile lemma nearly as long as the spikelet, smooth, shining. LA PAZ: LARECAJA: Sorata, *Holway* 507 (US). COCHABAMBA: CERCADO: Morochata, 2900 m., *Cárdenas* 3414 (US).

4. ***P. candidum*** (Humb. & Bonpl. ex Flüggé) Kunth in Mém. Mus. Hist. Nat. 2: 68 (1815). Annual, decumbent, straggling, the culms



often to 1 m. or more in length, the dark nodes somewhat enlarged and strigose to villous. Leaf-sheaths ciliate near the apex, otherwise pilose or glabrous; blades to 12 cm. long and 1.2 cm. wide, finely pilose on both surfaces. Panicle lax, with 7-20 ascending solitary racemes to 4 cm. long, rachis to 2.5 mm. wide, prolonged beyond the uppermost spikelet. Spikelets to 2.5 mm. long, glabrous, both glumes absent. Sterile lemma 3-nerved. Fertile lemma shorter than the sterile, smooth, ivory-white, shining. LA PAZ: SUR YUNGAS: San Felipe, 2800 m., *Hitchcock* 22597 (GH); Sirupaya, 2100 m., *Buchtien* (in *Baenitz Herb. Amer.*) 1408 (GH).

5. *P. depauperatum* Presl, Rel. Haenk. 1: 215 (1830). *P. vinosum* Mez in Fedde, Rep. Sp. Nov. 15: 28 (1917). Decumbent annual, the dark, purplish culms to 1.8 dm. long. Leaf-sheaths glabrous, or, in youth, pilose near the apex, ciliate; blades to 7 cm. long and 4 mm. wide, pilose or papillate-pubescent on both surfaces. Panicle of up to 7 solitary racemes, 1.5-3 cm. long, the rachis prolonged beyond the uppermost spikelet. Spikelets glabrous, less than 2 mm. long, glumes absent. Sterile lemma 3-veined. Fertile lemma shining. COCHABAMBA: CHAPARE: Incachaca, 2250 m., *Steinbach* 9495 (GH).

6. *P. lineispatha* Mez in Fedde, Rep. Sp. Nov. 15: 27 (1917). Rather straggling annual, the light-colored culms to 30 cm. tall. Leaf-sheaths densely papillate-pilose; blades to 6 cm. long and 9 mm. wide, densely papillate-pilose beneath, sparsely so above. Panicle of 2-12 solitary racemes to 1.5 cm. long, the rachis prolonged beyond the uppermost spikelet, less than 2 mm. wide. Spikelets glabrous, less than 2 mm. long, glumes absent. Sterile lemma 3-veined. Fertile lemma shining. LA PAZ: LARECAJA: Hacienda Casana near Tipuani, 1400 m., *Buchtien* 7112 (GH).

7. *P. Ceresia* (O. Ktze.) Chase in Niles in Contrib. U. S. Nat. Herb. 24: 153 (1925). *P. membranaceum* of the Catalogue. Perennial, to 6 dm. tall, villous at the base, shortly rhizomatous. Leaf-blades to 15 cm. long and 8 mm. wide, pilose near the margin on the upper surface. Panicle of 1-4 distant racemes, the rachis-proper dark, with orange-brown broad margins, to 1 cm. wide overall, prolonged beyond the uppermost spikelet. Spikelets to 4 mm. long, with a dense silver-white pilosity, the longest hairs as long as the spikelet, hairs mostly papillate-based. Second glume present. Without locality: *Bang* 1080 (GH). LA PAZ: LARECAJA: Cerro del Iminapi, 2600-2700 m., *Mandon* 1255 (GH). SANTA CRUZ: SARA: Buenavista, 500 m., *Steinbach* 5421 (GH).

8. *P. stellatum* Humb. & Bonpl. ex Flüggé, Monogr. Pasp. 62 (1810). Caespitose perennial to 5 dm. tall. Leaf-sheaths densely long-pilose. Inflorescence of 1 arcuate raceme (rarely 2) to 10 cm. long, the broad yellow-brown rachis prolonged beyond the uppermost spikelet. Spikelets to 2.5 mm. long, second glume present; second glume and sterile lemma with very short white hairs and long shining hairs,



these more or less stellate in arrangement. Fertile lemma shorter than the spikelet. SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 1988 (GH), 7103 (GH).

9. **P. Humboldtianum** Flügge, Monogr. Pasp. 67 (1810). Caespitose perennial to 8 dm. tall, the base rather woody. Leaf-sheaths papillate-pilose, sometimes glabrate; blades flat, to 18 cm. long and 1.5 cm. wide, papillate-pilose or glabrate. Panicle of 2 to several racemes, neither solitary nor conjugate, the narrow rachis not coarsely scabrid-ciliate, not exceeding the uppermost spikelet, usually dull purple. Spikelets mostly purple, to 3.5-4 mm. long. Second glume present, shortly pubescent with appressed hairs, the margins with numerous long papillate-based hairs. Sterile lemma shorter than second glume, glabrous. Fertile lemma dull white, thin-textured. LA PAZ: LARECAJA: Cerro del Iminapi, 2650 m., *Mandon* 1254 (GH). COCHABAMBA: MIZQUE: near Vilavila, 2500 m., *Eyerdam* 24977 (GH); CHAPARE: Locotal, 1900 m., *Steinbach* 9093 in part (GH). SANTA CRUZ: SARA: Cerro del Amboró, 6618 (GH); Buenavista, 450 m., *Steinbach* 6644 (GH); VALLEGRANDE: Cuesta de La Negra, *Steinbach* 3712 (GH).

10. **P. erianthum** Nees in Trin. Gram. Pan. 121 (1826). Perennial, densely caespitose, to 1 m. tall. Leaf-sheaths variably pilose and ciliate; blades sparsely to densely pilose. Panicle of few to several erect racemes, raceme-rachis narrow, not prolonged beyond the uppermost spikelet, not coarsely scabrid-ciliate. Spikelets to 5 mm. long, ovate, acute. Second glume sparsely long-villous, with a marginal fringe of long silky hairs. Sterile lemma more nearly glabrous except at apex. Fertile lemma pale, shining, finely reticulate-striate. SANTA CRUZ: SARA: Buenavista, *Steinbach* 3543 (GH).

11. **P. Buchtienii** Hack. in Fedde, Rep. Sp. Nov. 6: 153 (1908). Caespitose perennial, somewhat straggling, to 10 dm. tall. Leaf-sheaths usually densely long-ciliate, otherwise glabrous; blades to 15 cm. long and 1.5 cm. wide, usually glabrous or glabrate on the upper surface. Panicle of 8-16 purplish racemes to 10 cm. long, neither solitary nor conjugate, the very narrow rachis not extended beyond the uppermost spikelet, not coarsely scabrid-ciliate. Spikelets to 3.5-4 mm. long, second glume present, shortly acuminate, ciliate with a long fringe of stiff white hairs. Sterile lemma glabrous. Fertile lemma shorter than the spikelet. YUNGAS: *Bang* 265 (GH); Puente Villa, 1400 m., *Cárdenas* 3597 (GH). LA PAZ: NOR YUNGAS: Polo-Polo, 1100 m., *Buchtien* 266 (GH), 447 (GH); SUR YUNGAS: Chulumani, 1600 m., *Hitchcock* 22664 (GH); La Florida, 1840 m., *Hitchcock* 22648 (GH).

12. **P. polyphylla** Nees ex Trin. Gram. Pan. 114 (1810). Perennial, to 6 dm. tall. Leaf-sheaths somewhat pilose at the apex, otherwise glabrous; blades to 5 cm. long, about 3 mm. wide, flat to subinvolute, puberulent on both surfaces. Panicle of 1-3 racemes to 7 cm. long, light in color, the narrow rachis not coarsely scabrid-ciliate, not prolonged beyond the uppermost spikelet. Spikelets to 3.5 mm. long,



second glume present, 5-nerved, densely ciliate with long, stiff, white hairs. Sterile lemma 5-nerved, ciliate on at least the upper margin. Fertile lemma as long as the sterile, thin-textured. SANTA CRUZ: VALLEGRANDE: Cuesta de La Negra, 1500 m., *Steinbach* 3718 (GH); SARA: Buenavista, 500 m., *Steinbach* 5385 (GH), 5762 (GH), 6808 (GH).

13. *P. distichum* L. Syst. Nat. (ed. 10) 2: 855 (1759). Stoloniferous perennial to 6 dm. tall, the nodes pubescent. Leaf-sheaths sparsely hispid-ciliate at the apex, otherwise glabrous; blades subinvolute to flat, to 6 mm. wide, the base sparsely hispid-ciliate, otherwise glabrous. Panicle of 2 conjugate racemes (rarely 3) to 7 cm. long, the rachis not coarsely scabrid-ciliate, not prolonged beyond the uppermost spikelets. Spikelets 2.5-3.5 mm. long. First glume often present, but not over 0.5 mm. long; second glume abruptly acute, pubescent to puberulent, the midrib prominent. Sterile lemma similar but glabrous, the midrib prominent. Fertile lemma shorter than spikelet, greenish-white, somewhat shining, often shortly penicillate at the abruptly acute apex. LA PAZ: MURILLO: La Paz, *Buchtien* 4518 (US). COCHABAMBA: CERCADO: Cochabamba, *Hitchcock* 22793 (US). SANTA CRUZ: SARA: Río Surutú, 400 m., *Steinbach* 6835 (GH).

14. *P. decumbens* Swartz, Prodr. 22 (1788). Branched, decumbent perennial, the culms to 6 dm. tall. Leaf-sheaths finely pubescent and densely short-ciliate; blades flat, to 10 cm. long and 8 mm. wide, pubescent on both surfaces, the margins ciliate, at least near the base. Inflorescence a solitary raceme 2-3 cm. long, the narrow rachis not prolonged beyond the uppermost spikelet, not coarsely long-ciliate. Spikelets about 1.5 mm. long, obovate to suborbicular, paired, glabrous. First glume present on one or both spikelets in a pair, very short; second glume rounded, half the length of the spikelet. Sterile lemma similar but usually twice as long. Fertile lemma shining, longitudinally regularly striate, the ridges finely and regularly papillate. LA PAZ: LARECAJA: Hacienda Simaco, 1400 m., *Buchtien* 5314 (GH). COCHABAMBA: CHAPARE: Antahuacana, Espíritu Santo, 750 m., *Buchtien s. n.* (GH). SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 7016 (GH). YUNGAS: *Bang* 266 in part (at least as to GH sheet).

15. *P. inconstans* Chase in Contrib. U. S. Nat. Herb. 24: 446 (1927). Perennial, to 8.5 dm. tall, the culms branched above. Leaf-sheaths short-ciliate, pubescent at the apex; blades flat, to 15 cm. long and 1.2 cm. wide, rather densely pubescent on both surfaces. Panicle of 1-8 (usually 2-5) non-conjugate racemes, the narrow rachis not prolonged beyond the uppermost spikelet and not coarsely scabrid-ciliate. Spikelets paired, about 2.5 mm. long. First glume usually present, at least as a rudiment, on the lower of the paired spikelets; second glume shorter than the spikelet, 3(-5)-nerved, the margin puberulent. Sterile lemma somewhat longer, sometimes slightly puberulent on the margin. Fertile lemma somewhat shining, very finely papillate-striate. LA



PAZ: NOR YUNGAS: San José, 1500 m., *Hitchcock* 22734 (GH); SUR YUNGAS: La Florida, 1840 m., *Hitchcock* 22609 (GH).

16. *P. lepidum* Chase in Contrib. U. S. Nat. Herb. 27: 447 (1927). Densely caespitose perennial, to 4.5 dm. tall, the culms simple. Leaf-sheaths pubescent at the apex, otherwise glabrous to pubescent; blades to 11 cm. long and 1 cm. wide, densely pubescent on both surfaces. Panicle of 3-4 non-conjugate racemes, the narrow rachis not coarsely scabrid-ciliate, not prolonged beyond the uppermost spikelet. Spikelets paired, to 2.4 mm. long. First glume seldom present; second glume 5-nerved, somewhat puberulent or pubescent at the summit. Sterile lemma slightly longer, 5-nerved, glabrous. Fertile lemma very finely papillate-striate. LA PAZ: SUR YUNGAS: San Felipe, 2800 m., *Hitchcock* 22605 (GH).

17. *P. paniculatum* L. Syst. Nat. (ed. 10) 2: 855 (1759). Perennial, branching, to 1 m. or more in height, the culm-nodes pilose to pubescent. Leaf-sheaths glabrous, ciliate; blades flat, to 30 cm. long and 1.5 cm. wide. Panicle of numerous, crowded, non-conjugate racemes, the narrow rachis not coarsely scabrid-ciliate, not prolonged beyond the uppermost spikelet. Spikelets paired, suborbicular, about 1.2-1.4 mm. long. Second glume present. Sterile lemma pubescent. Fertile lemma minutely papillate-striate. LA PAZ: LARECAJA: Hacienda Simaco, 1400 m., *Buchtien* 5323 (GH); NOR YUNGAS: Polo-Polo, 1100 m., *Buchtien* 269 (GH); Milluguaya, 1300 m., *Buchtien* 269 (GH); SUR YUNGAS: La Florida, 1840 m., *Hitchcock* 22624 (GH).

18. *P. Juergensii* Hack. in Fedde, Rep. Sp. Nov. 7: 312 (1909). Perennial, to 1 m. high, somewhat straggling or decumbent, the nodes dark, often with long hispid hairs. Leaf-sheaths villous-ciliate, often with papillate-based hairs; blades flat, to 20 cm. long and 1.5 cm. wide, long-pubescent above and beneath with papillate-based hairs, or glabrate. Panicle of several lax non-conjugate racemes, rachis of racemes not coarsely scabrid-ciliate, not prolonged beyond the uppermost spikelet. Spikelets paired, to 1.7 mm. long, second glume present, pubescent, rather blunt. Sterile lemma glabrous. Fertile lemma somewhat shining, very finely papillate-striate. YUNGAS: *Bang* 308 (GH).

19. *P. multicaule* Poir. Encycl. Suppl. 4: 309 (1816). Annual, much-branched from the base, about 1 dm. tall. Leaf-sheaths hispid-ciliate, often pilose; blades narrow, linear, pilose, the margins hispid-ciliate. Panicle of 2 conjugate divergent racemes, rarely 1, or still more rarely 3; raceme-rachis not prolonged beyond the uppermost spikelet, not coarsely scabrid-ciliate. Spikelet suborbicular, 1-1.25 mm. long, second glume present. Glume and sterile lemma with short, clavate to falcate or globose, swollen, transparent, unicellular hairs. Fertile lemma shining, minutely papillate-striate. LA PAZ: LARECAJA: San Carlos, Mapiri, 850 m., *Buchtien* 16 (GH).

20. *P. pictum* Ekman in Ark. Bot. 10 (17): 11 (1911). Annual, somewhat tufted, to 3.5 (-5) dm. tall, the nodes glabrous. Leaf-sheaths



glabrous; blades very narrow, linear, flat to conduplicate, scabridulous above, glabrous beneath or with a few papillate-based hispid hairs. Racemes usually 2 (occasionally 1 or 3), somewhat conjugate; raceme-rachis not prolonged beyond the uppermost spikelet, not coarsely long-ciliate. Spikelets obovoid, to 1 mm. long, glabrous, second glume present. Fertile lemma broader than second glume and sterile lemma, markedly papillate-striate at maturity. SANTA CRUZ: SARA: Buena-vista, *Steinbach* 1894 (GH).

21. *P. inaequivalve* Raddi, *Agrost. Bras.* 28 (1823). Perennial, the culms broadly spreading and rooting at the lower nodes. Leaf-sheaths finely pubescent to glabrous, the hairs papillate-based; blades flat, to 25 cm. long and 1.5 cm. wide, cordate-clasping at the base, sparsely pilose above and beneath with papillate-based hairs. Panicle of few to many spreading non-conjugate racemes, the narrow raceme-rachis not coarsely long-ciliate, not prolonged beyond the uppermost spikelet. Spikelets paired, elliptic, to 2 mm. long. First glume absent or sometimes present on 1 spikelet of the pair, very short; second glume half as long as the spikelet, finely pubescent to glabrous. Sterile lemma finely pubescent or glabrous. Fertile lemma shining, pale green-brown. LA PAZ: NOR YUNGAS: Coripata, *Hitchcock* 22691 (GH).

22. *P. conjugatum* Berg. in *Act. Helv. Phys. Math.* 7: 129 (1762). Perennial, creeping, the flattened culms to 1 m. high, but usually shorter. Leaf-sheaths densely short-ciliate, with an apical ring of long soft hairs; blades flat, to 20 cm. long and 8 mm. wide, the margins shortly scabrid-ciliate, otherwise usually glabrous. Panicle usually of 2 long (10-12 cm.) arcuate, divaricate, conjugate racemes, rarely a third raceme below; raceme-rachis narrow, not coarsely scabrid-ciliate, not extending beyond the uppermost spikelet. Spikelets to 1.5 mm. long, strongly flattened, suborbicular. First glume absent, second glume thin, with a marginal fringe of long silky hairs. Sterile lemma thin, glabrous. Fertile lemma pale, rather shining. LA PAZ: LARECAJA: Hacienda Simaco, 1400 m., *Buchtien* 6325 (GH); NOR YUNGAS: Polo-Polo, 1100 m., *Buchtien* 268 (GH). SANTA CRUZ: SARA: Buena-vista, 450 m., *Steinbach* 1862 (GH), 500 m., *Steinbach* 5160 (GH); Dolores, 450 m., *Steinbach* 6836 (GH).

23. *P. dilatatum* Poir. *Encycl.* 5: 35 (1804). Perennial, to 1.5 m. tall, from a short rhizomatous base. Leaf-sheaths sometimes pilose at the base, otherwise glabrous, ciliate near the apex; blades flat, to 2.5 dm. long and 1.2 cm. wide, the base somewhat ciliate. Panicle usually of 3-5 non-conjugate racemes, the narrow rachis not prolonged beyond the uppermost spikelet, the margin not coarsely scabrid-ciliate. Spikelets to 3.8 mm. long, ovoid, acute. First glume absent, second glume covered with long silky hairs, especially dense along the margin. Sterile lemma slightly shorter than the second glume, the margin not densely silky. Fertile lemma pale, finely papillate-striate. TARIJA: CERCADO: Tarija, 2000 m., *Cárdenas* 202 (GH).



24. *P. Urvillei* Steud. Syn. Pl. Glum. 1: 24 (1854). Stout perennial, to 2.5 m. tall. Leaf-sheaths hirsute, ciliate, or the upper sheaths glabrous; blades to 4.5 dm. long, pilose at the base, otherwise glabrous. Panicle of numerous, ascending, non-conjugate racemes, the raceme-rachis narrow, margin scabrid but not coarsely scabrid-ciliate, not prolonged beyond the uppermost spikelet. Spikelets to 2.5 mm. long, ovoid, obtuse. Second glume and sterile lemma with many long silky hairs on the margin, the glume sparsely hairy on the back, the lemma glabrous on the back. Fertile lemma pale, smooth or nearly so. LA PAZ: LARECAJA: Sorata, *Gunther* (US).

25. *P. notatum* Flügge, Monogr. Pasp. 106 (1810). Perennial, from a short rhizome, to 5 dm. tall. Leaf-sheaths ciliate at the apex, otherwise glabrous; blades flat, to 3 dm. long and 1 cm. wide, ciliate at the base, otherwise glabrous. Panicle of 2 divergent racemes, conjugate or nearly so (rarely a third raceme present); raceme-rachis narrow, glabrous, not extended beyond the uppermost spikelet. Spikelets unpaired, glabrous, obovoid to ovoid, about 3 mm. long. Second glume present, as long as the sterile lemma, firm-textured. Fertile lemma rather indurate, finely papillate-striate. SANTA CRUZ: SARA: Dolores, 450 m., *Steinbach* 1833 (GH); Buenavista, 450-500 m., *Steinbach* 5273 (GH), 7020 (GH). TARIJA: O'CONNOR: near Entre Rios, 1300 m., *West* 8249 (GH).

26. *P. minus* Fourn. Mex. Pl. 2: 6 (1886). Densely matted perennial, to 3 dm. high. Leaf-sheaths mostly glabrous, long-ciliate. Panicle of 2 conjugate or nearly conjugate racemes (occasionally 3); raceme-rachis narrow, not prolonged beyond the uppermost spikelet, not coarsely scabrid-ciliate. Spikelets solitary, glabrous, to 2.5 mm. long, broadly ovoid, subobtuse. Second glume present, sterile lemma similar but slightly shorter, both with prominent green midribs. Fertile lemma shorter, pale, somewhat shining, finely striate. LA PAZ: LARECAJA: San Carlos, *Buchtien* 79 (US).

27. *P. melanospermum* Desv. in Encycl. Suppl. 4: 315 (1816). Spreading annual, culms to 7 dm. long, the bases decumbent. Leaf-sheaths glabrous; blades flat or folded, to 15 cm. long and 1 cm. wide, pilose at the base on the upper surface, otherwise glabrous. Panicle of 2-7 non-conjugate racemes; raceme-rachis very narrow, not coarsely scabrid-ciliate, not extended beyond the uppermost spikelet. Spikelets usually paired, to 2 mm. long, obovoid. Second glume present, thin, somewhat strigose; sterile lemma thin, the margin wrinkled. Fertile lemma dark-brown and shining, obscurely striate. SANTA CRUZ: SARA: Buenavista, *Steinbach* 5459 (GH).

28. *P. plicatum* Michx. Fl. Bor.-Am. 1: 45 (1803). Perennial, 0.5-1 m. tall. Leaf-sheaths usually glabrous but papillate-hispid on the margins; blades to 5 dm. long and 1 cm. wide, papillate-pilose at the base of the upper surface. Panicle of several to many non-conjugate racemes; raceme-rachis narrow, not coarsely scabrid-ciliate, not



extended beyond the uppermost spikelet. Spikelets paired, to 3 mm. long, obovoid. Second glume present, thin, sparsely appressed-pubescent (occasionally glabrous). Sterile lemma thin, glabrous, transversely rugulose near the base. Fertile lemma dark chestnut-brown, shining, striate. LA PAZ: NOR YUNGAS: Coripata, *Hitchcock* 22675 (GH). SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 1829 (GH), 1869 (GH), 6873 (GH), 6887 bis (GH), 7036 (GH).

29. **P. collinum** Chase in *Contrib. U. S. Nat. Herb.* 27: 451 (1927). Perennial, to 6.5 dm. tall. Leaf-sheaths glabrous, with a few marginal hairs near the apex; blades flat, to 2 dm. long and 9 mm. wide, rather sparsely long-ciliate. Panicle of 4 distant ascending racemes 2-6 cm. long, the raceme-rachis about 0.7 mm. wide, not coarsely scabrid-ciliate, not prolonged beyond the uppermost spikelet. Spikelets paired, pedicellate, the pedicels glabrous, to 2.5 (-2.7) mm. long. Second glume shortly appressed-pubescent. Sterile lemma more sparsely pubescent than the glume, 5-nerved. Fertile lemma dark brown, papillate-striate, shining. LA PAZ: NOR YUNGAS: Coroico, 1560 m., *Hitchcock* 22723 (US; type).

30. **P. virgatum** L. *Syst. Nat.* (ed. 10) 2: 855 (1759). Stout perennial, to 1-2 m. tall. Leaf-sheaths papillate-hirsute on the margins and at the apex; blades flat, to 7.5 dm. long and 2.5 cm. wide, upper surface papillate-hirsute at the base. Panicle of several to many racemes; raceme-rachis narrow, not prolonged beyond the uppermost spikelet, margin scabrid-ciliate, with scattered, long, hispid hairs. Spikelets paired, to 2.5 mm. long, obovoid. Second glume with long silky hairs around margin. Sterile lemma puberulent to glabrous. Fertile lemma shining chestnut-brown, papillate-striate. LA PAZ: LARECAJA: San Carlos, Mapiri, 850 m., *Buchtien* 52 (GH); NOR YUNGAS: Hacienda El Choro, Coripata, 1700 m., *Buchtien* 8044 (GH).

31. **P. conspersum** Schrad. ex Schult. *Mant.* 2: 174 (1817). Perennial, to 1.2 m. tall. Leaf-sheaths glabrous or papillate-pilose; blades sometimes subcordate at the base, flat, sometimes papillate-pubescent on the upper surface. Panicle of several (to 16) non-conjugate racemes; raceme-rachis narrow, the margin scabridulous to scabrid, but without long hispid hairs, not prolonged beyond the uppermost spikelet. Spikelets paired, to 3 mm. long, ellipsoid, acute. Second glume and sterile lemma thin, 5-nerved, one or both shortly pubescent. Fertile lemma chestnut-brown, papillate-striate. LA PAZ: NOR YUNGAS: Coripata, *Hitchcock* 22696 (US).

32. **P. millegrana** Schrad. ex Schult. *Mant.* 2: 175 (1824). Stout perennial, 1-2 m. tall. Leaf-sheaths glabrous or with a few hairs near the apex; blades folded, to 7.5 dm. long and 1.5 cm. wide, the upper surface often papillate-pubescent. Panicle of several to many non-conjugate racemes to 1.5 dm. long; raceme-rachis coarsely scabrid-serrate and sparsely hispid-ciliate, not prolonged beyond the uppermost spikelet. Spikelets paired, obovoid to suborbicular, glabrous, to



2.5 mm. long. Second glume and sterile lemma firm, 3-nerved. Fertile lemma pale, finely papillate-striate. BENI: YACUMA: Reyes, *Cárdenas* (M. E.) 1656 (Hitchcock).

33. **P. densum** Poir. *Encycl.* 5: 32 (1804). Stout perennial, to 1.2 m. tall. Leaf-sheaths glabrous, or the margin ciliate, or somewhat pubescent to hirsute at the apex; blades folded, often to 1 m. long and 2 cm. wide, but generally shorter and narrower. Panicle of many non-conjugate racemes; raceme-rachis narrow, not prolonged beyond the uppermost spikelet, coarsely scabrid and densely hispid-ciliate. Spikelets paired, suborbicular, to 2.2 mm. long, glabrous. Second glume and sterile lemma 3-nerved, thin. Fertile lemma pale, shining, finely papillate-striate. SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 3264 (GH), 6898 (GH).

34. **P. remotum** Remy in *Ann. Sci. Nat. (ser. 3) Bot.* 6: 349 (1846). Perennial, decumbent to 10 dm. tall, glabrous. Leaf-blades to 2 dm. long and 1 cm. wide, the margins strongly scabrous. Panicle of 2-5 non-conjugate racemes; raceme-rachis narrow, not coarsely scabrid-ciliate, not prolonged beyond the uppermost spikelet. Spikelets paired, to 3.2 mm. long, ovoid. Second glume and sterile lemma green, pubescent, the glume 5-nerved, the lemma 3-nerved. Fertile lemma pale, shining, finely papillate-striate. LA PAZ: LARECAJA: Sorata, *Mandon* 1252 (GH), *Bang* 1312 (GH). COCHABAMBA: CERCADO: Cochabamba, *Hitchcock* 22807 (GH); Mollemolle, 2800 m., *Steinbach* 4055 (GH).

35. **P. pilosum** Lam. *Tabl. Encycl.* 1: 175 (1791). Perennial, somewhat tufted, to 11.5 dm. tall, usually shorter. Leaf-sheaths papillate-pubescent to glabrous, with ciliate margins; blades flat, to 4 dm. long and 8 mm. wide, pubescent above and beneath, margins and base often with papillate-hispid hairs. Racemes solitary, to 15 cm. long, the narrow rachis with few to many papillate-based hispid hairs, not prolonged beyond the uppermost spikelet. Spikelets paired, glabrous, ovoid, to 3 mm. long. First glume small to minute; second glume 5-nerved, firm, shorter than mature fruit. Sterile lemma 5-nerved, firm. Fertile lemma pale, markedly papillate-striate. LA PAZ: LARECAJA: San Carlos, Mapiri, 850 m., *Buchtien* 15 (GH).

36. **P. Ekmanianum** Henr. in *Meded. Rijks Herb. Leiden*, no. 40: 49 (1921). Perennial, to 6 dm. tall. Leaf-sheaths ciliate; blades to 1 dm. long, the upper surface papillate-pilose. Racemes solitary (very rarely 2 racemes on a culm), the narrow rachis not prolonged beyond the uppermost spikelet, not coarsely scabrid-ciliate. Spikelets paired, oblong-ellipsoid, to 2 mm. long. Second glume and sterile lemma covered with white hairs of varying lengths, the longest more than twice the length of the spikelet. Fertile lemma pale, rather shining, smooth. SANTA CRUZ: SARA: Buenavista, 450-500 m., *Steinbach* 1818 (GH), 5320 (GH), 6923 (GH).

37. **P. malacophyllum** Trin. *Gram. Pan. Icon.* 3: t. 271 (1831). Perennial, to 1-2 m. tall. Leaf-sheaths sparsely papillate-pilose;



blades to 25 cm. long and 2.5 cm. wide, densely to sparsely pubescent beneath. Panicle of numerous non-conjugate racemes; raceme-rachis narrow, sparsely ciliate, not prolonged beyond the uppermost spikelet. Spikelets paired, mostly less than 2 mm. long, often purplish, glabrous. Glumes absent, sterile lemma firm, midrib prominent. Fertile lemma often purplish, strongly ribbed, papillate-striate. LA PAZ: LARECAJA: Hacienda Casana, *Buchtien* 7110 (US).

38. *P. boliviense* Chase in Contrib. U. S. Nat. Herb. 24: 454 (1927). Perennial, 1-1.5 m. high. Leaf-sheaths pubescent or pilose at the base, otherwise glabrous; blades flat, to 2 dm. long and 2 cm. wide, margins scabrid, occasionally a few long hairs near the base, otherwise glabrous. Panicle of numerous non-conjugate racemes; raceme-rachis puberulent, narrow, not prolonged beyond the uppermost spikelet. Spikelets paired, usually purplish, mostly over 2 mm. long, glabrous. Glumes absent. Sterile lemma with a prominent midrib. Fertile lemma strongly 7-nerved, strongly papillate-striate. LA PAZ: LARECAJA: Sorata, *Bang* 1306 (GH; type-number); prope Munaypata, Cerro del Iminapi, 2650 m., *Mandon* 1253 (GH). COCHABAMBA: CERCADO: Cochabamba, *Hitchcock* 22866 (US).

39. *P. saccharoides* Nees in Trin. Gram. Icon. 1: t. 107 (1828). Perennial, stoloniferous, to 1.2 m. high. Leaf-sheaths usually glabrous, sometimes papillate-pilose or papillate, densely ciliate; blades flat, to 3 dm. long and 1.5 cm. wide, the upper surface papillate-pilose, the lower surface glabrous. Panicle of many slender drooping racemes, more or less flabellately arranged; raceme-rachis very narrow, hardly winged, prolonged beyond the uppermost spikelet. Spikelets solitary, distant, lanceolate, acute or acuminate, to 3 mm. long. Second glume often puberulent on the back, marginal fringe of long white hairs, mixed with shorter hairs. Sterile lemma thin, glabrous, shorter than the glume. Fertile lemma thin, not indurate. LA PAZ: LARECAJA: San Carlos, Sarampiuni (Mapiri), 500 m., *Buchtien* 65 (GH); NOR YUNGAS: Coripata, *Hitchcock* 22686 (GH).

## 82. *Panicum* L.

Annual or perennial; leaf-blades not or barely reaching the inflorescence, rarely exceeding it, linear to lanceolate to elliptic-oblong, acute, glabrous or variously pubescent. Inflorescence a simple to complex panicle, with spikelets from densely racemose on the branches to remote and solitary at the ends of the branchlets. Spikelets pedicellate, disarticulating below the 2 glumes; 2-flowered, the lower floret a sterile lemma (2 sterile lemmas in *P. quadriglume*), or sometimes a staminate floret, the upper floret perfect; fruit indurate or chartaceous-indurate, the lemma-margins inrolled and partly concealing the similar palea.

a. Inflorescence simple, a central axis with the primary branches densely flowered one-sided racemes.



- b. Primary branches unbranched, short, very densely flowered.
- c. Spikelets hispidulous to hispid.
  - d. Sterile lemma with 2 crateriform glands; fruit not rugose. .... 16. *P. pulchellum*.
  - d. Sterile lemma glandless; fruit rugose. .... 1. *P. echinulatum*.
- c. Spikelets glabrous.
  - e. Longest leaf-blades not over 5 cm. long and 2 mm. wide. .... 14. *P. stoloniferum*.
  - e. Longest leaf-blades 9-15 cm. long and 1.5-2 cm. wide.
    - f. Inflorescence-axis pilose with long hairs; second glume 1.5 mm. long. .... 11. *P. pilosum*.
    - f. Inflorescence-axis puberulous to short-pubescent, but not pilose; second glume over 2 mm. long. .... 15. *P. frondescens*.
- b. Primary branches branched, usually from the base, less densely flowered.
  - g. Stem-nodes pubescent to hirsute. .... 10. *P. polygonatum*.
  - g. Stem-nodes glabrous.
    - h. Longest leaf-blades to 20 cm. long and 1.4 cm. wide, basally cordate and subpetiolate. .... 13. *P. boliviense*.
    - h. Longest leaf-blades to 10 cm. long and 1 cm. wide, basally not cordate nor subpetiolate. .... 12. *P. laxum*.
- a. Inflorescence complexly branched, not composed of one-sided racemes; if racemose, the racemes not one-sided and the spikelets not densely crowded.
  - i. Spikelets not solitary at ends of branchlets.
    - j. Spikelets hirsutulous to long-hirsute.
      - k. Spikelets 5.5-7 mm. long; fruit rugose. .... 29. *P. paucispicatum*.
      - k. Spikelets 4 mm. long or less; fruit not rugose.
        - l. Spikelets long-hirsute, 3.5-4 mm. long. .. 32. *P. procurrens*.
        - l. Spikelets hirsutulous, about 2 mm. long. .... 26. *P. pantrichum*.
    - j. Spikelets glabrous.
      - m. Primary panicle-branches (except at uppermost nodes) in verticils. .... 30. *P. megiston*.
      - m. Primary panicle-branches not in verticils (except sometimes at the lowest node only).
        - n. First glume 1 mm. or less. .... 2. *P. aquaticum*.
        - n. First glume 2-3 mm.
          - o. Leaf-blades to 10 cm. long and 1 cm. wide. .... 27. *P. cordovense*.
          - o. Leaf-blades to 20 cm. long and 4 mm. wide. .... 9. *P. tricholaenoides*.
- i. Spikelets remote, solitary at ends of branches, or appearing so.
  - p. Spikelets minutely puberulent to sparsely hispidulous.



- q. Inflorescence-axis glabrous; first glume less than 0.5 mm. long. .... 17. *P. trichanthum*.
- q. Inflorescence-axis not glabrous; first glume 1-2 mm. long.
  - r. Spikelets 2 mm. long; axis and branches pilose below. .... 25. *P. sciurotis*.
  - r. Spikelets 3.5 mm. long; axis and branches hirsute-hispid below. .... 23. *P. Rudgei*.
- p. Spikelets glabrous.
  - s. Spikelets 6-8 mm. long. .... 31. *P. olyroides*.
  - s. Spikelets less than 5 mm. long.
    - t. Spikelets with 2 sterile lemmas. .... 7. *P. quadriglume*.
    - t. Spikelets with 1 sterile lemma.
      - u. Fruit rugose or rugulose.
        - v. Second glume to 3.5 mm. long; fertile lemma 2.5 mm. long, rugose. .... 8. *P. maximum*.
        - v. Second glume 2 mm. long; fertile lemma 2 mm. long, rugulose. .... 24. *P. Sellowii*.
      - u. Fruit not rugose nor rugulose.
        - w. Leaf-sheaths papillate-pilose.
          - x. Spikelets 3-4 mm. long.
            - y. Spikelets 3.5-4 mm. long, acute; first glume 1 mm. long. .... 5. *P. stramineum*.
            - y. Spikelets 3 mm. long, acute to acuminate; first glume 1.5-2 mm. long. .... 6. *P. peladoëense*.
          - x. Spikelets not over 2.5 mm.
            - z. First glume 1.5 mm. long; leaf-blade to 1 cm. wide; fertile lemma about 1.5 mm.
              - A. Leaf-blades pilose above and beneath. .... 3. *P. cayennense*.
              - A. Leaf-blade glabrous above, pubescent to glabrate beneath. .... 4. *P. hirticaule*.
            - z. First glume 1 mm. long; leaf-blade to 1.5 cm. wide; fertile lemma about 2 mm. long. .... 24. *P. hebotès*.
  - w. Leaf-sheaths glabrous; or, if somewhat pubescent, not papillate-pilose.
    - B. Glumes distinctly unequal.
      - C. First glume 1 mm. long; leaf-blades 4 mm. wide, not cordate at base. .... 19. *P. cyanescens*.
      - C. First glume 0.5 mm. long; leaf-blades to 1 cm. wide, cordate-clasping at base. .... 20. *P. nervosum*.
    - B. Glumes subequal or nearly so.
      - D. Spikelets viscid-glutinous. .... 18. *P. glutinosum*.
      - D. Spikelets not viscid-glutinous.
        - E. Leaf-blades about 2 cm. long. .... 22. *P. parvifolium*.



E. Leaf-blades to 20 cm. long. ....  
 ..... 28. *P. versicolor*.

1. ***Panicum echinulatum*** Mez in Notizbl. 7: 62 (1917). *P. echinulatum* var. *boliviense* Henr. in Meded. Rijks Herb. Leiden, no. 40: 50 (1921). Annual, spreading, culms to 3.5 dm. high. Leaf-sheaths pubescent along the margins, otherwise glabrous; blades lanceolate, acute, to 11 cm. long and 1.4 cm. wide, firm-textured, the thickened margins undulate and ciliolate, glabrous above and beneath. Panicles less than 10 cm. long, axis, branches and pedicels glabrous, scabridulous on the margins. Spikelets to 4 mm. long, usually about 3.5 mm., acute, hispid. Glumes very unequal; first glume broadly ovate, abruptly acute, to 1.5 mm. long, 3-nerved; second glume 3.5 mm. long, acute, 5-nerved. Sterile lemma as long as second glume and similar in appearance. Fertile lemma shorter than the sterile lemma, sub-obtuse, indurate, transversely rugose. TARIJA: ENTRE RIOS: Villa Montes, *Pflanz* 607 (Hitchcock). SANTA CRUZ: CERCADO: Santa Cruz, 450 m., *Steinbach* 5259 (GH).

2. ***P. aquaticum*** Poir. *Encycl. Suppl* 4: 281 (1816). Perennial, often decumbent and spreading, in wet places or actually in water, the culms to 10 dm. tall. Leaf-sheaths glabrous, the lance-linear blades to 25 cm. long and 1 cm. wide, acute, glabrous. Panicle to 25 cm. long at maturity, the branches somewhat erect but spreading, axis, branches and pedicels glabrous, their margins sometimes scabridulous. Spikelets glabrous, acute, to 3 mm. long. Glumes quite unequal; first glume 1 mm. long, or less, truncately acute, broadly clasping at the base, 1-nerved; second glume 3 mm. long, acute, about 9-nerved. Sterile lemma similar to second glume, slightly shorter and fewer-nerved. Fertile lemma about 2 mm. long, acute, shining, longitudinally striatulate. SANTA CRUZ: SARA: Buenavista, *Steinbach* 3180 (GH).

2a. ***P. aquaticum*** var. ***chloroticum*** (Nees ex Trin.) R. C. Foster, comb. nov. *P. chloroticum* Nees ex Trin. *Gram. Pan.* 236 (1826). Sympatric with and similar in all respects to *P. aquaticum* except for smaller spikelets, 2-2.5 mm. long. BENI: YACUMA: Reyes, *Rusby* (M. E.) 1636 (US).

3. ***P. cayennense*** Lam. *Encycl. Tabl.* 1: 173 (1791). Annual, erect, the culms to 5 dm. tall. Leaf-sheaths papillate-pilose, the linear blades to 16 cm. long and 1 cm. wide, pilose above and beneath. Panicles to 20 cm. long, rather open, the axis hispid-pilose, branches and pedicels glabrous, the margins scabridulous. Spikelets to 2.5 mm. long, usually a little less, glabrous, somewhat acute. Glumes unequal; first glume nearly 1.5 mm. long, acute, 5-nerved; second glume a little over 2 mm. long, acute, 7-nerved. Sterile lemma as long as second glume, 5-nerved. Fertile lemma 1.5 mm. long, obtuse, firm, longitudinally striatulate. SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 6935 (GH).

4. ***P. hirticaule*** Presl, *Rel. Haenk.* 1: 308 (1830). Annual, spread-



ing, the culms usually less than 5 dm. tall. Leaf-sheaths variably hispid, but mostly papillate-pilose, the blades lance-linear, to 15 cm. long and 8 mm. wide, variably hispid to pubescent or glabrate beneath. Panicle open, to 15 cm. long, usually shorter, axis and main branches sparsely long-hispid, branchlets and pedicels scabridulous on the margins. Spikelets about 2.5 mm. long, acute, glabrous. Glumes unequal; first glume 1.5 mm. long, acute, 3-5-nerved, the nerves not anastomosing; second glume about 2.5 mm. long or a little shorter, 7-nerved. Sterile lemma about 2.5 mm. long. Fertile lemma about 1.5 mm. long, shining, warm brown, longitudinally striatulate. BENI: CERCADO MOJOS: Trinidad, 200 m., *Cárdenas* 3534 (GH). SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 7086 bis (GH).

5. *P. stramineum* Hitchc. & Chase in Contrib. U. S. Nat. Herb. 15: 67 (1910). Annual, erect or spreading, the culms to 5 dm. tall but usually shorter. Leaf-sheaths usually papillate-pilose, but sometimes almost glabrous, the lance-linear blades to 20 cm. long and 8 mm. wide, glabrous to sparsely pilose, at least beneath, the margins sparsely long-ciliate to glabrous. Panicle open, about 15 cm. long, axis, branches and pedicels glabrous but scabridulous on the margins. Spikelets 3.5-4 mm. long, glabrous, acute. Glumes very unequal; first glume about 1 mm. long, obtuse or abruptly acute, 3-5-nerved, the nerves anastomosing; second glume 3 mm. long, acute, many-nerved. Sterile lemma as long as or slightly longer than the second glume, subobtuse, many-nerved. Fertile lemma about 2.5 mm. long, shining, firm-textured. BENI: YACUMA: Reyes, *Cárdenas* (M. E.) 1647 (US).

6. *P. peladoëense* Henr. in Blumea, 4(3): 504 (1941). Perennial, to 4 dm. tall. Leaf-sheaths papillate-pilose; blades scabridulous-puberulent above and beneath, sparsely papillate-hirsute above and beneath, the long hairs hispid, blade to 4 mm. wide. Panicle to 12 cm. long, axis and branches glabrous, branchlets and pedicels scabridulous. Spikelets glabrous, acute to acuminate, 3 mm. long. Glumes unequal; first glume ovate, 1.5-2 mm. long, subacute, 5-nerved; second glume 2.5-3 mm. long, 5-nerved, acute. Sterile lemma about 3 mm. long, or slightly longer, acute to acuminate. Fertile lemma about 2 mm. long, dark-brown, shining, obtuse. SANTA CRUZ: VALLEGRANDE: Cuesta de los Monos, 1400 m., *Herzog* 1896j (cited in original description; not seen).

The only material of this species which has been seen is an isotype, *Balansa* 4357, in the United States National Herbarium. The description is based entirely on this. Since no Bolivian material has been seen in two large herbaria, it is possible that the attribution of the species to Bolivia rests on a misdetermination.

7. *P. quadriglume* (Doell) Hitchc. in Contrib. U. S. Nat. Herb. 24: 460 (1927). Perennial, the culms to 4 dm. tall, the nodes densely



pilose. Leaf-sheaths papillate-pilose, blades to 20 cm. long and 5 mm. wide, linear, pilose above and beneath. Panicle rather open at maturity, to 15 cm. long, axis, branches and pedicels glabrous, the branches and pedicels scabridulous on the margins. Spikelets to 3 mm. long, glabrous, acute, with 2 sterile lemmas. Glumes unequal; first glume 1.5 mm. long, broad, acute, 5-nerved, the lateral nerves more or less anastomosing; second glume 2.5 mm. long, 7-nerved. Sterile lemmas 3 mm. long, about 7-nerved. Fertile lemmas about 2 mm. long, firm-textured, shining, dark brown (paler in immaturity). LA PAZ: NOR YUNGAS: Milliguaya, 1100 m., *Buchtien* 4174 (GH). SANTA CRUZ: SARA: Buenavista, 450-500 m., *Steinbach* 5299 (GH), 7076 bis (GH), 6979 (at least as to GH sheet).

8. *P. maximum* Jacq. Coll. Bot. 1: 76 (1786). Perennial, to 2 m. tall, culms with pubescent to somewhat hirsute nodes. Leaf-sheaths glabrous to sparsely papillate-hirsute, blades to 30 cm. long and 7 mm. wide, linear, glabrous above and beneath. Panicle open, to 3.5 dm. long, axis, branches and pedicels glabrous, the branches often shortly pubescent at the very base. Spikelets to 3.5 mm. long, glabrous, acute. Glumes unequal; first glume 1.5 mm. long, rather obtuse, obscurely nerved; second glume to 3.5 mm. long, about 7-nerved, the nerves rather obscure. Sterile lemma about as long as the second glume, 7-nerved. Fertile lemma 2.5 mm. long, strongly rugose, the apex often minutely puberulent. LA PAZ: NOR YUNGAS: Milliguaya, 1200 m., *Buchtien* 442 (in 1917) (GH); Polo-Polo, near Coroico, 1100 m., *Buchtien* 442 (in 1912) (GH).

9. *P. tricholaenoides* Steud. Syn. Pl. Glum. 1: 68 (1854). ? *P. giganteum* O. Ktze. Rev. Gen. 3(2): 360 (1898). Perennial, slender, erect, rhizomatous, the culms to 1 m. tall. Leaf-sheaths glabrous, the glabrous linear blades to 20 cm. long and 4 mm. wide, often inrolled. Panicle rather narrow, to 20 cm. long, the branches erect to rather spreading, axis glabrous, branches scabrid on the margins, the ultimate pedicels often ciliate with long stiff hairs, a group of such hairs often subtending the spikelets. Spikelets to 3 mm. long, glabrous, acute. Glumes unequal; first glume to 2 mm. long, rather narrowly acute, 3-nerved; second glume as long as the spikelet, 5-7-nerved. Sterile lemma shorter than second glume, obscurely nerved. Fertile lemma less than 2 mm. long, somewhat obtuse, shining, firm. SANTA CRUZ: SARA: Buenavista, campos de Dolores, 450 m., *Steinbach* 3220 (GH).

10. *P. polygonatum* Schrad. ex Schult. Mant. 2: 256 (1824). Perennial, somewhat sprawling, the culms 2-6 dm. tall, the nodes pubescent to hirsute. Leaf-sheaths ciliate, the lanceolate blades to 20 cm. long and 2 cm. wide, pilose above and beneath, at least when young, long-acute, the base subcordate and often subpetiolate. Panicle spreading, to 2.5 dm. long, the spikelets unilateral on the branches, the axis and branches scabridulous and sparsely hispid, the pedicels scabri-



dulous. Spikelets about 1.5 mm. long, acute, glabrous. Glumes unequal; first glume 1 mm. long, 1-nerved, the nerve apically scabridulous, acute; second glume as long as the spikelet, 5-nerved. Sterile lemma shorter than second glume, about 3-nerved. Fertile lemma 1 mm. long or slightly longer, acute, shining. LA PAZ: LARECAJA: Hacienda Simaco, 1400 m., *Buchtien* 5334 (GH); San Carlos, Mapiri, 850 m., *Buchtien* 74 (GH). SANTA CRUZ: SARA: Buenavista, 400 m., *Steinbach* 5231 (GH); Río Surutú, 500 m., *Steinbach* 6840 (GH).

11. *P. pilosum* Swartz, Prodr. 22 (1788). Spreading to ascending perennial, the culms to 6 dm. tall. Leaf-sheaths long-ciliate on the margins, otherwise glabrous to slightly pilose, the broadly linear blades to 15 cm. long and 1.5 cm. wide, usually glabrous beneath, scattered-pilose above, acute, abruptly rounded at the base. Panicle to 15 cm. long, the main axis glabrous or somewhat puberulent, the primary branches with long stiff hairs much exceeding the spikelets, pedicels glabrous to subpuberulous, the component racemes short (seldom more than 3 cm. long), densely flowered, ascending to somewhat spreading, usually arranged in verticils. Spikelets about 1.5 mm. long, sub-acute. Glumes unequal; first glume 1 mm. long, 3-nerved; second glume as long as the spikelet, 5-nerved. Sterile lemma like second glume, but sometimes slightly shorter, rather blunt, obscurely 5-nerved. Fertile lemma shorter than sterile, indurate, shining. LA PAZ: LARECAJA: San Carlos, Mapiri, 750 m., *Buchtien* 78 (GH).

12. *P. laxum* Swartz, Prodr. 23 (1788). Perennial, basally decumbent or spreading, culms 2-6 dm. tall. Leaf-sheaths densely ciliate, blades to 10 cm. long and 1 cm. wide, lanceolate, acute, the base abruptly contracted, glabrous above and beneath. Panicle fairly open, to 2 dm. long, the branches spreading and branched, the numerous spikelets unilaterally arranged, axis, branches and pedicels glabrous but the margins scabridulous. Spikelets to 1.5 mm. long, acute, glabrous. Glumes unequal; first glume less than 1 mm. long, 1-nerved, acute; second glume as long as the spikelet, 5-nerved. Sterile lemma as long as second glume, several-nerved, rather obtuse. Fertile lemma about 1 mm. long, shining. YUNGAS: *Bang* 308a (GH). LA PAZ: LARECAJA: Charopampa, 570 m., *Buchtien* 1168 (GH); San Carlos, 750 m., *Buchtien* 1179 (GH); Hacienda Simaco, 1400 m., *Buchtien* 5315 (GH). SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 2064 (GH), 5161 (GH), 5338 (GH), 6850 (GH); VALLEGRANDE: Comarapa, Yungas de San Mateo, 2500 m., *Steinbach* 8508 (GH).

13. *P. boliviense* Hack. in Fedde, Rep. Sp. Nov. 11: 19 (1912). Perennial, decumbent to spreading, the culms to 3-5 dm. tall. Leaf-sheaths ciliate, blades lanceolate to lance-oblong or occasionally lance-linear, to 20 cm. long and 1.4 cm. wide, rather long-acute, the base cordate to subcordate and subpetiolate, glabrous above and beneath. Panicle quite open at maturity, to 20 cm. long, axis, branches and pedicels often scabridulous on the margins, the lower primary branches



sometimes sparsely hispid in the axils, the spikelets more loosely arranged than in *P. laxum*. Spikelets 1.5 mm. long, acute or subobtuse, glabrous. Glumes unequal; first glume about 0.75 mm. long, 1-nerved or rather obscurely 3-nerved; second glume as long as the spikelet, 5-nerved. Sterile lemma as long as second glume, 5-nerved, subobtuse. Fertile lemma slightly longer than 1 mm., subobtuse, not markedly shining but rather dull, obscurely 3-nerved, longitudinally striatulate. SANTA CRUZ: SARA: Buenavista, 400-450 m., *Steinbach* 6857 (US, GH), 6944 bis (GH). COCHABAMBA: CHAPARE: Antahuacana, *Buchtien* 2501 (US; type-number).

14. *P. stoloniferum* Poir. *Encycl. Suppl.* 4: 274 (1816). Perennial, creeping and spreading, the flowering culms to 3 dm. tall. Leaf-sheaths pubescent, at least sparsely so, blades lanceolate, to 3.5-4 cm. long and 5 mm. wide, puberulent above and beneath, at least when young, acute, abruptly narrowed at the base and usually subpetiolate. Panicle small, occasionally to 5 cm. long, the component racemes seldom over 1 cm. long, axis glabrous or nearly so, branches and pedicels glabrous to somewhat puberulous. Spikelets 2.5-3 mm. long, acute, glabrous. Glumes very unequal; first glume 1 mm. long, or slightly longer, 3-nerved, the central nerve prominent; second glume 2.5 mm. long, 5-nerved. Sterile lemma about 3 mm. long, 5-nerved. Fertile lemma 1.5 mm. long, indurate, shining, acute, obscurely nerved, not rugose. LA PAZ: LARECAJA: Mapiri, *Buchtien* 1167 (US).

15. *P. frondescens* Meyer, *Frimit. Fl. Esseq.* 56 (1818). Annual (?), decumbent, rooting at the nodes, the flowering culms to 3 or even 5 dm. tall. Leaf-sheaths ciliate, blades to 9-10 cm. long and 2 cm. wide, lance-ovate, acuminate, the wide base abruptly narrowed and shortly petiolate, scabridulous above and beneath. Panicles to 13 cm. long, main axis puberulent to pubescent, branches and pedicels glabrous. Spikelets to 3 mm. long, usually shorter, acute, glabrous. Glumes very unequal; first glume 1 mm. long, broadly ovate, abruptly acute, rather obscurely 3-nerved, the midrib scabridulous above; second glume to 2.25 mm. long, shorter than the spikelet, acute, 5-nerved. Sterile lemma similar to second glume but 2.5-3 mm. long. Fertile lemma about 1.5 mm. long, narrow, acute, indurate, shining, smooth. LA PAZ: NOR YUNGAS: Polo-Polo, near Coroico, 1100 m., *Buchtien* 264 (GH), 1173 (GH). SANTA CRUZ: SARA: Buenavista, 400 m., *Steinbach* 5130 (GH), 6855 (GH).

16. *P. pulchellum* Raddi, *Agrost. Bras.* 42 (1823). Slender spreading perennial, the flowering culms to 2-3 dm. tall. Leaf-sheaths shortly ciliate, the blades lance-ovate, to 6 cm. long and 1.7 cm. wide, basally subcordate, glabrous above, sometimes sparsely puberulent beneath. Panicle to 10-11 cm. long, the branches remote, axis and branches sparsely pubescent to hispidulous, the pedicels mostly glabrous. Spikelets to 2.5 mm. long, from nearly glabrous to hispidulous or hispid, acute. Glumes unequal; first glume 1 mm. or slightly less,



ovate, acute, 3-nerved; second glume 2 mm. long, ovate, acute, 5-nerved. Sterile lemma about 2 mm. long, long-acute, 5-nerved. Fertile lemma 1.5 mm. long, chartaceous, shining, not rugose. LA PAZ: SUR YUNGAS: Guanay, *Rusby* 217 (US).

17. *P. trichanthum* Nees, *Agrost. Bras.* 210 (1829). Straggling perennial, the culms to 1 m. tall. Leaf-sheaths long-ciliate, otherwise glabrous, blades to 15 cm. long and 2 cm. wide (rarely wider), sparsely to densely pubescent above and beneath, at least when young, lanceolate, acute, basally abruptly rounded and somewhat clasping. Panicle large, diffuse, to 20 cm. long, axis, branches and pedicels glabrous. Spikelets minutely puberulous to glabrous, solitary, to 1.5 mm. long. Glumes very unequal; first glume less than 0.5 mm. long, white-papery, not obviously nerved; second glume as long as the spikelet, 5-nerved. Sterile lemma as long as second glume and similar in appearance. Fertile lemma less than 1.5 mm. long, indurate, not rugose, shining. LA PAZ: NOR YUNGAS: Coroico, *Buchtien* 445 (GH), 446 (US); SUR YUNGAS: Chulumani, *Hitchcock* 22660 (US). SANTA CRUZ: CORDILLERA: Puerto Suarez, *Agnes Chase* 11155 (GH).

18. *P. glutinosum* Swartz, *Prodr.* 24 (1788). Perennial, to 1-2 m. tall, decumbent at the base. Leaf-sheaths glabrous with a hispid collar at the apex, the blades to 30 cm. long and 2.5 cm. wide, the margins hispid-ciliate, especially at the base, otherwise glabrous or glabrescent. Panicle open, to 3 dm. long, axis, branches and pedicels glabrous, or the margins finely scabridulous. Spikelets glutinous, subobtuse, to 3-3.5 mm. long. Glumes approximately equal; first glume 2.25 mm. long, broad, 5-nerved, obtuse; second glume about 2.5 mm. long, 7-nerved, obtuse. Sterile lemma 3 mm. long, 5-nerved. Fertile lemma 2.5 mm. long, firm-textured, minutely puberulent at the apex. LA PAZ: LARECAJA: Mapiri, 830 m., *Rusby* 244 (GH); Hacienda Simaco, near Tipuani, 1400 m., *Buchtien* 5316 (GH). SANTA CRUZ: SARA: Monte del Fraile, Buenavista, 450 m., *Steinbach s. n.* (GH).

19. *P. cyanescens* Nees, *Agrost. Bras.* 220 (1829). Slender perennial, the culms to 6 dm. tall. Leaf-sheaths glabrous, sparsely hispid-pilose at the apex, the linear blades mostly less than 10 cm. long, 4 mm. wide, glabrous above and beneath. Panicle diffuse, less than 10 cm. long, axis, branches and pedicels glabrous. Spikelets to 2 mm. long, ovoid, glabrous. Glumes unequal; first glume 1 mm. long, subobtuse, 1-nerved, with 2 obscure lateral nerves; second glume 1.5 mm. long, obtuse, 5-nerved. Sterile lemma slightly over 1 mm. long, obscurely nerved. Fertile lemma 1.5 mm. long, shining, longitudinally striatulate. SANTA CRUZ: SARA: Buenavista, 500 m., *Steinbach* 5175 (GH), 6940 in part (GH).

20. *P. nervosum* Lam. *Encycl.* 4: 747 (1798). Perennial, the culms 3-6 dm. tall. Leaf-sheaths somewhat hispid-ciliate, otherwise glabrous, the blades to 8-9 cm. long and 1 cm. wide, glabrous above and beneath, acute, cordate-clasping. Panicle diffuse, to 12-15 cm. long, axis,



branches and pedicels glabrous. Spikelets about 1.5 mm. long, glabrous, rather narrowly ovoid, subobtuse. Glumes markedly unequal; first glume 0.5 mm. long, obtuse to subacute, obscurely nerved; second glume 1.5 mm. long, obscurely 7-nerved. Sterile lemma slightly shorter than second glume, or equal to it. Fertile lemma slightly over 1 mm. long, subacute, shining, longitudinally striatulate. SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 1213 (GH); CERCADO: bañado de Piray, 450 m., *Steinbach* 1980 (GH).

21. *P. Sellowii* Nees, *Agrost. Bras.* 153 (1829). Perennial, spreading, the culms to 1 m. tall. Leaf-sheaths ciliate, pubescent to pilose, often glabrate with age, the lance-linear blades to 20 cm. long and 2 cm. wide, pilose above and beneath, or glabrate with age, acute, the base often abruptly rounded and subpetiolate. Panicle very open at maturity, to 15 cm. long, the branches remote and with the relatively few spikelets along the upper half on slender pedicels, axis and branches sparsely pilose below, pedicels and upper branches scabridulous. Spikelets 2-2.5 mm. long, glabrous. Glumes unequal; first glume to 1.5 mm. long, acute, 1-nerved; second glume 2 mm. long, 5-nerved, subacute. Sterile lemma to 2.5 mm. long, obscurely 5-nerved. Fertile lemma about 2 mm. long, shining, transversely rugulose. LA PAZ: LARECAJA: San Carlos, near Mapiri, 850 m., *Buchtien* 53 (GH); Hacienda Simaco, 1400 m., *Buchtien* 5317 (GH); NOR YUNGAS: Bella Vista, *Hitchcock* 22752 (GH); SUR YUNGAS: La Florida, 1840 m., *Hitchcock* 22638 (GH). COCHABAMBA: CHAPARE: Locotal, 1600 m., *Steinbach* 9095 (GH).

22. *P. parvifolium* Lam. *Encycl. Tabl.* 1: 173 (1791). Straggling perennial, the culms to 3 dm. tall. Leaf-sheaths glabrous, the blades about 2 cm. long and 5 mm. wide, pilose above and beneath, occasionally glabrous, lanceolate, acute, cordate or subcordate at the base. Panicle open, to 5 cm. long, axis, branches and pedicels glabrous. Spikelets about 1.5 mm. long, glabrous, more or less elliptic-ovoid, obtuse. Glumes somewhat unequal; first glume a little over 1 mm. long, 3-nerved; second glume 1.5 mm. long, 5-nerved, subacute. Sterile lemma as long as second glume, 5-nerved, obtuse. Fertile lemma slightly over 1 mm. long, longitudinally striatulate, shining. SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 6646 (GH), 6865 (GH), 7011 (GH), 6940 in part (GH).

23. *P. Rudgei* Roem. & Schult. *Syst. Veg.* 2: 444 (1817). Tufted perennial, the often flexuose culms to 1 m. tall. Leaf-sheaths densely papillate-pilose, blades more or less linear, acute, to 30 cm. long and 8 mm. wide, equaling the inflorescence, puberulent to pubescent above, pubescent to short-pilose beneath. Panicle large, to 3-4 dm. long, the branches erectly spreading, the axis hirsute-hispid below, glabrous above, branches scabridulous on margins, spikelets remote and solitary at ends of branches. Spikelets to 3.5 mm. long, at least the first glume somewhat hispid. Glumes unequal; first glume 2 mm. long,



5-nerved, very acute, hispid on upper portion; second glume 3 mm. long, 5-nerved, mostly glabrous. Sterile lemma 3 mm. long, glabrous, 7-nerved. Fertile lemma to 2.5 mm. long, obtuse, indurate, shining, longitudinally striatulate. LA PAZ: LARECAJA: San Carlos, 950 m., *Buchtien* 32 (GH).

24. *P. hebetes* Trin. in Mém. Acad. St. Pétersb. (ser. 6) Sci. Nat. 1: 301 (1834). Perennial, the culms to 6.5 dm. tall. Leaf-sheaths papillate-pilose, the lanceolate blades to 15 cm. long and 1.5 cm. wide, pilose above and beneath, acute, basally cordate. Panicle rather diffuse, to 15 cm. long, axis densely pilose, primary branches more sparsely pilose below, glabrous above, branchlets and pedicels glabrous. Spikelets 2 mm. long, acute, glabrous. Glumes unequal; first glume 1 mm. long, acute, 3-nerved, sometimes obscurely so; second glume 2 mm. long, acute, 9-nerved. Sterile lemma slightly longer than the second glume, about 7-nerved. Fertile lemma slightly less than 2 mm. long, subacute. YUNGAS: *Bong* 493 in part (at least as to GH sheet).

25. *P. sciurotis* Trin. Gram. Pan. 228 (1826). Slender perennial, caespitose, culms to 4 dm. tall, rarely to 6 dm. Leaf-sheaths pubescent, blades lanceolate, to 7 cm. long and 1.2 cm. wide, puberulent above and beneath, acute, the base abruptly cordate-clasping. Panicle much-branched, usually less than 10 cm. long, the branching fine, axis and branches pilose below, glabrous above, pedicels glabrous. Spikelets solitary, to 2 mm. long, minutely puberulous to glabrous. Glumes unequal; first glume 1 mm. long, acute, 1-nerved; second glume 1.5 mm. long, subobtuse, 5-nerved. Sterile lemma nearly 2 mm. long, 7-nerved, subobtuse. Fertile lemma 1.5 mm. long, acute, shining, more or less indurate. LA PAZ: SUR YUNGAS: Chulumani, 1600 m., *Hitchcock* 22669 (GH), 22709 (GH).

26. *P. pantrichum* Hack. in Verh. Zool. Bot. Ges. Wien, 1915: 72 (1915). Spreading perennial, lower nodes rooting, culms 2-3 dm. tall, but usually shorter. Leaf-sheaths somewhat papillate-pilose, blades lanceolate, to 7-8 cm. long and 8 mm. wide, acute, puberulent above and beneath. Mature panicle spreading, to 15 cm. long, axis and branches scabridulous, the long pedicels puberulent to scabridulous. Spikelets 2 mm. long, or a little longer, hirsutulous to nearly glabrous, ovoid, obtuse. Glumes unequal; first glume 1.5 mm. long, 3-nerved; second glume as long as the spikelet, 5-nerved. Sterile lemma as long as the spikelet, 5-nerved. Fertile lemma indurate, smooth, shining, sometimes obscurely striatulate. LA PAZ: LARECAJA: Mapiri, *Buchtien* 1171 (US).

27. *P. cordovense* Fourn. Mex. Pl. 2: 26 (1886). Perennial, straggling, culms to 20 cm. tall. Leaf-sheaths papillate-pilose, densely ciliate, the blades to 10 cm. long and 1 cm. wide, lanceolate, acute, glabrous. Panicle to 15 cm. long, axis, branches and pedicels glabrous. Spikelets to 3-3.5 mm. long, acute, glabrous. Glumes somewhat un-



equal; first glume about 3 mm. long, 3-nerved; second glume as long as the spikelet, abruptly acute, 7-nerved. Sterile lemma slightly shorter than second glume, 7-nerved, obtuse. Fertile lemma about as long as the sterile, obtuse, rather indurate, shining. LA PAZ: SUR YUNGAS: La Florida, 1840 m., *Hitchcock* 22647 (GH).

28. *P. versicolor* Doell in Mart. Fl. Bras. 2(2): 254 (1877). Perennial, shortly rhizomatous, erect, the culms to 6 dm. tall. Leaf-sheaths hirsute-ciliate, otherwise sparsely pubescent to glabrous, the linear blades to 20 cm. long and 8 mm. wide, pubescent to glabrous or glabrate. Panicle open, to 10-15 cm. long, axis, branches and pedicels glabrous. Spikelets 2.5 to nearly 3 mm. long, glabrous, asymmetric, racemose on remote slender pedicels along the upper portion of branches, appearing solitary at ends of branchlets. Glumes nearly equal; first glume 1 mm. long, subacute to obtuse, obscurely 3-nerved; second glume slightly over 1 mm. long, about 5-nerved. Sterile lemma about 2.5 mm. long, containing a staminate floret, winged, splitting at maturity. Fertile lemma 2 mm. long, dark brown, shining, with a marked dorsal ridge. SANTA CRUZ: SARA: Río Dolores, *Steinbach* 3542 (GH); Buenavista, 450 m., *Steinbach* 6643 (GH), 6656 (GH).

29. *P. paucispicatum* Morong in Ann. N. Y. Acad. 7: 262 (1893). Coarse perennial, to 1 m. high, usually less, the culms pubescent. Leaves oblong to lanceolate, acute, to 6.5 cm. long and 1.5 cm. wide, densely short-pubescent and ciliate, blades flat. Panicle about 10 cm. long, few-branched, axis, branches and pedicels densely puberulent, the pedicels with an apical collar of long stiff hairs subtending the spikelet. Spikelets fusiform, acuminate, hirsutulous, 5.5-7 mm. long. Glumes unequal, hirsutulous; first glume about 3 mm. long, strongly 5-nerved; second glume as long as the spikelet, strongly 7-nerved. Sterile lemma 5-7 mm. long, hirsutulous above, sparsely so below, about 5-nerved. Fertile lemma indurate, rugose, abruptly acute and subrostrate. SANTA CRUZ: CERCADO: Palmar, *Herzog* 1524 (US).

30. *P. megiston* Schult. Mant. 2: 248 (1824). Stout perennial, creeping at the base, the culms to 1-2 m. tall. Leaf-sheaths sparsely papillate-pilose, the blades lanceolate, to 40 cm. long and 3 cm. wide, long-acute, glabrous above and beneath. Panicle to 6 dm. long, spreading, the primary branches in distant verticils (usually opposite or alternate at the uppermost node), axis hispid at the nodes, otherwise glabrous, branches and pedicels scabridulous on the margins. Spikelets glabrous, to 4 mm. long, broadly ovoid, abruptly acute, usually solitary or in groups of 2 along the branches. Glumes very unequal; first glume about 1.5 mm. long, abruptly subacute, strongly 3-nerved, broader than long and basally completely clasping; second glume about 3.5 mm. long, abruptly acute, 9-11-nerved. Sterile lemma about 3 mm. long, subobtuse, 7-nerved. Fertile lemma about 3 mm. long, abruptly acute, indurate, shining. LA PAZ: CAUPOLICÁN: Ixiamas, *White* (M. E.) 1135 (*Hitchcock*).



31. *P. olyroides* HBK. Nov. Gen. & Sp. 1: 102 (1816). Erect perennial, the culms to 10 dm. tall. Leaf-sheaths markedly imbricate, glabrous, the linear firm blades to 30 cm. long and 8 mm. wide, glabrous above and beneath. Panicle open, to 3 dm. long, the axis, branches and pedicels densely scabrid-ciliate, the few spikelets on long slender pedicels near the branch-ends. Spikelets 6-8 mm. long, glabrous, fusiform, long-acute. Glumes unequal; first glume to 6 mm. long, long-acute, 5-7-nerved; second glume to 8 mm. long, long-acute, about 9-nerved, with 2 internal basal tufts of subhispid hairs. Sterile lemma to 3.5 mm. long, acute, the nerves prominent near the apex only. Fertile lemma to 3.5 mm. long, obtuse, shining, the base with 2 lateral patches of short, white, crispate hairs. SANTA CRUZ: SARA: Buenavista, 450-500 m., *Steinbach* 5378 (GH), 6978 (GH).

32. *P. procurrens* Nees ex Trin. Gram. Pan. 183 (1826). Decumbent perennial, spreading, the culms to 6 dm. tall, usually shorter. Leaf-sheaths glabrous with an adaxial apical collar of hairs, blades lance-linear, to 5-6 cm. long and 4-5 mm. wide, acute, white-margined, glabrous to puberulent, often scabridulous beneath. Panicle to 15 cm. long, axis pubescent, the erect branches usually mostly glabrous, the spikelets often somewhat approximate. Spikelets about 3.5-4 mm. long, acute to subacuminate, long-hirsute. Glumes unequal; first glume 2.5 mm. long, strongly 3-nerved, long-acute; second glume 3-3.5 mm. long, 5-nerved, subacute to subobtuse. Sterile lemma as long as second glume, 5-nerved, acute. Fertile lemma shorter than sterile lemma, smooth, shining, chartaceous. SANTA CRUZ: SARA: Dolores, 450 m., *Steinbach* 1801 (GH); Buenavista, 450-500 m., *Steinbach* 5339 (GH), 6940 bis in part (GH), 7012 (GH).

### 83. *Ichnanthus* Beauv.

Perennials, erect, decumbent or creeping. Leaves pubescent or glabrous. Inflorescence a panicle. Spikelets pedicellate, disarticulating below the glumes, 2-flowered, the lower floret a sterile lemma or staminate, the upper floret perfect. Glumes 2, the lemma shortly stipitate, the stipe with a pair of membranous appendages basally adnate to the base of the fertile lemma, free above, or the appendages wanting and represented by a pair of small pits or scars.

a. Lemma-appendages present.

b. Lemma-appendages suborbicular, 0.4 mm. long; spikelets 3 mm. long, obtuse. .... 1. *I. calvescens*.

b. Lemma-appendages narrowly deltoid, 0.6 mm. long; spikelets to 5 mm. long, acute. .... 2. *I. peruviana*.

a. Lemma-appendages wanting.

c. Leaf-sheath auricles well-developed, to 4 mm. long. .... 3. *I. breviscrobis*.

c. Leaf-sheath auricles not developed.

d. First glume shorter than second.



- e. Inflorescences terminal and axillary, usually less than 10 cm. long.
- f. Spikelets glabrous, or if with a few hairs, these not papillate-based. .... 4. *I. pallens*.
- f. Spikelets sparsely pilose, the hairs papillate-based. ....  
..... 5. *I. candicans*.
- e. Inflorescences terminal only, to 20 cm. long. ....  
..... 6. *I. Ruprechtii*.
- d. First glume longer than second. .... 7. *I. minarum*.

1. ***Ichnanthus calvescens*** (Nees) Doell in Mart. Fl. Bras. 2(2): 285 (1877). Decumbent, the culms to 1 m. tall. Leaf-sheaths pubescent to villous, or glabrous; blades long, lance-elliptic, long-acute, 1-2 cm. wide, densely pubescent above and beneath. Inflorescence to 2 dm. long, narrow, the branches ascending, rachis, branches and pedicels scabridulous, the rachis and branches villous-hispid at the nodes. Spikelets about 3 mm. long, obtuse. First glume about 2.25 mm. long, acute, 3-nerved, the keel scabridulous; second glume about 3 mm. long, 5-nerved. Sterile lemma 3 mm. long. Fertile lemma about 2 mm. long, the appendages suborbicular, 0.4 mm. long. LA PAZ: NOR YUNGAS: Milliguaya, *Buchtien* 737 (Hitchcock); SUR YUNGAS: Chulumani, *Hitchcock* 22653 (Hitchcock).

2. ***I. peruviana*** Mez in Fedde, Rep. Sp. Nov. 15: 129 (1918). Spreading, to 1 m. tall. Leaf-sheaths pubescent to villous; blades lanceolate, to 10 cm long and 1.5 cm. wide, pubescent above and beneath, or scabridulous above. Panicle to 2 dm. long, open, the few branches short, distant, few-flowered, rachis, branches and pedicels scabridulous on the margins. Spikelets to 5 mm. long, acute. First glume to 5 mm. long, acute, puberulent at the apex, 3-nerved, the keel scabridulous; second glume 4 mm. long, obtuse, puberulous at the apex, 5-nerved, the keel scabridulous above. Sterile lemma about 4 mm. long, obtuse, puberulent, somewhat shortly penicillate, at the apex, rather obscurely 5-nerved. Fertile lemma about 2.5-2.75 mm. long, shining, the apex incurved as a short thick beak, the appendages narrowly deltoid, subobtuse, 0.6 mm. long. LA PAZ: NOR YUNGAS: Coroico, 1560 m., *Hitchcock* 22715 (GH).

3. ***I. breviscrops*** Doell in Mart. Fl. Bras. 2(2): 294 (1877). Erect, stout, to 3-5 m. tall. Leaf-sheaths glabrous, with a pair of well-developed auricles to 4 mm. long at the apex; blades long, lanceolate, to 4 cm. wide, scabridulous above and beneath. Panicle open, to 3 dm. long, the branches ascending, rachis, branches and pedicels puberulent. Spikelets 4 mm. long, obtuse. First glume 2.5 mm. long, obtuse, puberulent, 3-nerved, the nerves scabridulous-ciliate; second glume 4 mm. long, obtuse, puberulent, 7-nerved. Sterile lemma 4 mm. long, puberulent above. Fertile lemma 3 mm. long, the apex incurved as a short, thick, blunt beak, appendages wanting, the pits small. LA PAZ: LARECAJA: San Carlos, Mapiri, 750 m., *Buchtien* 60 (GH).



4. *I. pallens* (Swartz) Munro ex Benth. Fl. Hongk. 414 (1861). Creeping, the culms to 3 dm. long. Leaf-sheaths papillate-pilose, auricles not developed; blades ovate to lanceolate, to 10 cm. long, 1-2 cm. wide, asymmetric, glabrous to papillate-pilose above and beneath. Inflorescences terminal and axillary, to 6 cm. long, the branches ascending-spreading, rachis and branches somewhat pilose, the pedicels scabridulous-puberulent. Spikelets to 4 mm. long, acute, glabrous or often with a few long hairs near the nerves and margin, the hairs not papillate-based. First glume 3 mm. long, long-acuminate, 3-nerved; second glume to 4 mm. long, acute, 5-nerved. Sterile lemma 3 mm. long, acute, 5-nerved. Fertile lemma about 2 mm. long, shining, obscurely keeled, the subacute apex only slightly incurved, appendages wanting. LA PAZ: LARECAJA: Hacienda Simaco, 1400 m., *Buchtien* 5322 (GH); SUR YUNGAS: Sirupaya, 1650 m., *Buchtien* (in Baenitz) 1401 (GH). COCHABAMBA: CHAPARE: Antahuacana, Espiritu Santo, 750 m., *Buchtien* 153 (GH). SANTA CRUZ: SARA: bosques del Fraile, 450 m., *Steinbach* 2258 (GH).

5. *I. candicans* (Nees) Doell in Mart. Fl. Bras. 2(2): 291 (1877). Creeping plant, much-branched. Leaf-sheaths papillate-villous, the auricles not developed; blades papillate-villous above and beneath, ovate, to 5 cm. long and 1.5 cm. wide. Inflorescences terminal and axillary, to 7-8 cm. long, branches ascending, rachis, branches and pedicels pubescent to scabridulous-puberulent. Spikelets to 4 mm. long, acute, the glumes sparsely papillate-pilose. First glume about 2.5 mm. long, long-acuminate, 3-nerved; second glume about 4 mm. long, shortly acuminate. Sterile lemma about 3 mm. long, obtuse, 5-nerved. Fertile lemma about 2 mm. long, shining, obscurely 3-nerved, very obtuse, the apex not incurved as a beak, appendages wanting. LA PAZ: LARECAJA: San Carlos, Mapiri, 850 m., *Buchtien* 6 (GH).

The line of demarcation between this species and *I. pallens* seems tenuous and rather difficult to draw.

6. *I. Ruprechtii* Doell in Mart. Fl. Bras. 2(2): 293 (1877). Spreading, to 1-2 m. tall. Leaf-sheaths mostly glabrous, auricles not developed; blades lanceolate, to 15 cm. long and 1 cm. wide, glabrous to sparsely pubescent above and beneath. Inflorescences terminal, to 2 dm. long, rachis, branches and pedicels pubescent to pilose, especially at and just below the nodes. Spikelets about 3-4 mm. long. First glume to 3 mm. long, subobtuse, 3-nerved, the keel scabrid-ciliate; second glume 3.5 mm. long, subobtuse. Sterile lemma 3 mm. long, subobtuse. Fertile lemma about 2.5 mm. long, shining, slightly incurved at the subacute apex, appendages wanting. LA PAZ: LARECAJA: Hacienda Simaco, 1400 m., *Buchtien* 5336 (GH).

7. *I. minarum* (Nees) Doell in Mart. Fl. Bras. 2(2): 294 (1877). Straggling, sprawling plant. Leaf-sheaths glabrous, auricles not developed; blades lanceolate, to 12 cm. long and 2 cm. wide, glabrous or sparsely pubescent above and beneath, the hairs often papillate-



based. Inflorescence a terminal panicle of a few unbranched racemes, the panicle to 10 cm. long, rachis, branches and pedicels puberulent-scabridulous. Spikelets dense on the raceme-axes, to 4.5 mm. long. First glume 4.5 mm. long, long-acute, scabridulous below, the keel scabridulous, a few long hairs near the apical margins; second glume 3.5 mm. long, similar to the first glume in pilosity. Sterile lemma 3 mm. long, glabrous, 5-nerved, subobtuse. Fertile lemma shining, about 2.5 mm. long, subacute, appendages wanting. LA PAZ: LARECAJA: Cerro del Iminapi, 2650 m., *Mandon* 1256 (GH); SUR YUNGAS: La Florida, 1840 m., *Hitchcock* 22619 (GH).

#### 84. *Lasiacis* (Griseb.) Hitchc.

Perennials, sprawling or clambering, to 10 m., much-branched, woody-stemmed. Leaves flat, rather firm, lanceolate to more or less elliptic, subpetiolate. Inflorescence a rather open panicle; spikelets obliquely placed on the pedicels, 2-flowered, the sterile lemma below the fertile, glumes markedly unequal, lanate at the apex; second glume and sterile lemma similar in appearance; fertile lemma and palea shining, indurate to bony, their apices briefly tufted with short woolly hairs in a slight crateriform depression; disarticulation below the glumes.

Ligule prominent, brown, to 2 mm. long; leaf-blades glabrous above.

..... 1. *L. ligulata*.

Ligule inconspicuous, usually hidden, sometimes to 1 mm. long; leaf-blades pubescent to papillate-hispid above and beneath. ....

..... 2. *L. sorghoidea*.

1. *Lasiacis ligulata* Hitchc. & Chase in Contrib. U. S. Nat. Herb. 18: 337 (1917). Plants to 5-10 m. long. Leaf-blades narrowly lanceolate, to 12 cm. long, somewhat pubescent to puberulous beneath. Panicle to 10 cm. long, rachis, branches and pedicels puberulent to scabridulous. Spikelets ovoid to obovoid, to 5 mm. long. First glume to 2.5 mm. long, many-nerved; second glume as long as the spikelet, many-nerved, the central nerve more prominent than the others. Sterile lemma as long as second glume, more shining. Fertile lemma slightly shorter than sterile lemma, longitudinally striatulate but not rugose. Glumes and sterile lemma black at maturity. LA PAZ: SUR YUNGAS: Colaya, 1760 m., *Mexia* 4307 (GH). COCHABAMBA: CHAPARE: Locotal, 1600 m., *Steinbach* 9091 (GH); Incachaca, 2400 m., *Steinbach* 9091 (GH).

2. *L. sorghoidea* (Desv.) Hitchc. & Chase in Contrib. U. S. Nat. Herb. 18: 338 (1917). Plants to 5-7 m. long. Leaf-blades lanceolate to somewhat elliptic, to 2.5 cm. long; sheaths sparsely to densely pubescent or villous, blades pubescent to papillate-hispid above and beneath. Panicle to 20 cm. long and nearly as broad at maturity, axis pubescent to sparsely hispid, branches and pedicels puberulent to scabridulous. Spikelets obovoid to subglobose, to 3.5-4 mm. long. First glume 1.5-2



mm. long, not conspicuously nerved, the central nerve prominent; second glume as long as the spikelet, many-nerved. Sterile lemma as long as second glume. Fertile lemma slightly shorter than sterile lemma, obtuse, prominently striatulate. LA PAZ: NOR YUNGAS: Milluguaya, 1300 m., *Buchtien* 157 (GH); SUR YUNGAS: Guanay, 630 m., *Rusby* 191 (GH). COCHABAMBA: CHAPARE: Antahuacana, Espiritu Santo, 750 m., *Buchtien* (in 1909) 161 (GH); CERCADO: Cochabamba, *Bang* 1289 (GH). SANTA CRUZ: SARA: 400-450 m., *Steinbach* 1931 (GH), 5551 (GH), 7111 (GH).

### 85. *Sacciolepis* Nash

*Sacciolepis myuros* (Lam.) Chase in Proc. Biol. Soc. Wash. 21: 7 (1908). Annual, to 1 m. high, in wet or marshy habitats. Leaf-blades flat or folded, long, linear, to 5 mm. wide, usually glabrous, but occasionally sparsely pilose above and beneath. Inflorescence a terminal, racemose, compact, narrow panicle, spicate in appearance, generally 10 cm. or less in length, occasionally to 20 cm., the rachis, branchlets and pedicels more or less densely puberulent. Spikelets about 2 mm. long, pointed, disarticulation below the glumes, 2-flowered, the lower floret a sterile lemma, occasionally a staminate floret, the upper floret perfect. Glumes unequal, the first to 1.5 mm. long, 3-nerved, the second inflated or somewhat saccate, to 2 mm. long, 7-9-nerved, often puberulous near the apex. Sterile lemma as long as the second glume and similar in appearance; fertile lemma shorter than the sterile and concealed by it, hard-textured, shining, sometimes sparsely and minutely puberulent, the margins not inrolled but revealing the hard shining palea, this shorter than but similar to the fertile lemma, the fruit minutely stipitate. SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 7030 (GH), 7101 (GH).

### 86. *Hymenachne* Beauv.

*Hymenachne donacifolia* (Raddi) Chase in Journ. Wash. Acad. Sci. 13: 177 (1923). Perennial, to 1 m. high, in wet or swampy habitats. Leaf-sheaths coarsely ciliate, the glabrous blades broadly lanceolate, to 20 cm. long and 3 cm. wide, the bases cordate-clasping or even somewhat auriculate. Inflorescence a terminal, racemose panicle to 3 dm. long, somewhat open, the branches mostly ascending, the rachis, branches and pedicels finely and densely puberulent. Spikelets clustered, acuminate, to 3 mm. long, 2-flowered, the lower floret a sterile lemma, the upper floret perfect; disarticulation below the glumes. Glumes very unequal, the first about 1 mm. long, acute, faintly 3-nerved, the keel ciliolate on the upper portion; second glume to 2 mm. long, acuminate, strongly 3-nerved, neither saccate nor inflated. Sterile lemma about 2.5 mm. long, acuminate, similar to the second glume; fertile lemma shorter than the sterile, without apparent



nerves, smooth, rather shiny, minutely puberulent near the apex, not firm and indurate. Palea as long as the fertile lemma, similar in appearance and texture. SANTA CRUZ: SARA: Curichis, monte de Palometillas, 400 m., *Steinbach* 2150 (GH).

### 87. *Homolepis* Chase

*Homolepis aturensis* (HBK). Chase in Proc. Biol. Soc. Wash. **24**: 146 (1911). A decumbent to sprawling perennial, culms to 5 dm. high. Leaf-sheaths densely ciliate and sparsely pilose, the narrowly lanceolate blades flat, to 1.5 cm. wide, often sparsely pilose when young and glabrescent with age, the margins scabridulous. Inflorescence a terminal, racemose, rather narrow panicle to 10 cm. long, the rachis, branches and pedicels glabrous. Spikelets to 7 mm. long, somewhat fusiform, 2-flowered, the upper floret perfect, the lower sterile or sometimes staminate, disarticulation below the glumes. Glumes equal or subequal, to 7 mm. long, the first glume 9-nerved, glabrous; second glume slightly shorter, fewer-nerved, the margins appressed-villous. Sterile lemma shorter than the glumes, enclosing the fertile lemma, densely appressed-villous along the margins; fertile lemma shorter than the sterile, glabrous, shining, firm-textured but not indurate, partially enclosing the similar but shorter palea. SANTA CRUZ: SARA: Buenavista, 450-500 m., *Steinbach* 1844 (GH), 5120 (GH), 7013 (GH).

### 88. *Isachne* R. Br.

*Isachne arundinacea* (Swartz) Griseb. Fl. Brit. W. Ind. 553 (1864). Climbing perennial, the branches up to 6 m. long. Leaf-blades flat, lanceolate, to 20 cm. long and 1.5-2 cm. wide, scabrid above and beneath. Inflorescence a terminal racemose panicle to 12 cm. long, the branches ultimately spreading, the rachis and branches puberulent-scabridulous, the pedicels usually glabrous. Spikelets subglobose, about 2 m. long, disarticulation below the glumes, 2-flowered, the upper floret perfect, the lower floret staminate or perfect. Glumes nearly equal, often suborbicular, about 1.5 mm. long, with a tuft of a few short hairs below the apex. Staminate lemma and palea equal in length, about 2 mm. long, indurate, shining; fertile floret slightly smaller; both lemmas with a few short basal hairs. YUNGAS: *Bang* 297 (GH).

### 89. *Oplismenus* Beauv.

*Oplismenus hirtellus* (L.) Beauv. Ess. Agrost. 54, 168 (1812). Spreading, much-branched perennial, the culms 3-5 dm. high. Leaf-sheaths glabrous to densely hirsute, the lanceolate or lance-ovate blades to 10 cm. long, glabrous above, sometimes scabridulous beneath, the margins undulate. Inflorescence a terminal few-branched panicle



of 3-6 short (1-3 cm.) densely flowered racemes, the spikelets paired or solitary, unilateral, very shortly pedicellate, the rachis scabridulous to pubescent or coarsely ciliate. Spikelets 2-flowered, the lower floret a sterile lemma, the upper floret perfect, disarticulation below the glumes. Glumes subequal, about 2.5-3 mm. long, 3-5-nerved, variably pubescent to nearly glabrous, awn of first glume to 6 mm. long, awn of second glume about 2 mm. long. Sterile lemma about 3 mm. long, about 7-nerved, variably pubescent, especially on the nerves, shortly awned or mucronate. Fertile lemma to 2.5 mm. long, indurate, shining, very faintly nerved, the flat margins clasping the palea. LA PAZ: LARECAJA: Hacienda Simaco, 1400 m., *Buchtien* 5331 (GH); NOR YUNGAS: Milluguaya, 1300 m., *Buchtien* 738 (GH); Coripata, *Bang* 2079 (GH). SANTA CRUZ: SARA: Buenavista, 450-500 m., *Steinbach* 1067 (GH), 1859 (GH), 5681 (GH), 1010 (GH); Dolores, 450 m., *Steinbach* 2036 (GH).

### 90. *Echinochloa* Beauv.

*Echinochloa crus-pavonis* (HBK.) Schult. Mant. 2: 269 (1824). Annual, erect to decumbent at base, the culms to 1 m. tall. Leaf-sheaths glabrous; blades linear, to 1.2 cm. wide, glabrous, the margins scabridulous. Inflorescence a terminal panicle of racemes, the spikelets solitary or unilaterally clustered on the racemes, the rachis hispid at the nodes, branches and pedicels scabrid. Spikelets about 3 mm. long, plano-convex, 2-flowered, the lower floret sterile or staminate, the upper floret perfect. First glume about 1.5 mm. long, broadly ovate, acute, few-nerved scabrid to hispidulous; second glume 3 mm. long, awned, few-nerved, the nerves strongly short-hispid. Sterile lemma 3 mm. long, few-nerved, the nerves short-hispid, the awn to 4 mm. long. Fertile lemma indurate, about 2.5 mm. long, with a terminal awn or mucro 0.5 mm. long, shining; palea similar but narrower and slightly shorter. LA PAZ: LARECAJA: vic. Sorata, *Mandon* 1258 (GH); Hacienda Simaco, 1400 m., *Buchtien* 5313 (GH); NOR YUNGAS: Coripata, *Bang* 2108 (GH); Polo-Polo, near Coroico, 1100 m., *Buchtien* 445 (GH).

### 91. *Setaria* Beauv.

See Rominger, J. M. Taxonomy of *Setaria* (Gramineae) in North America. Illinois Biological Monographs, no. 29. 1962.

Annuals or perennials, erect to decumbent and spreading. Leaf-sheaths and blades glabrous to varyingly pubescent. Inflorescence a condensed panicle, the branches seldom obvious, mostly spicate in appearance. Spikelets mostly plano-convex (very obscurely so in 1 species), subtended by 1 to several antrorsely or retrorsely scabrous bristles, 2-flowered, the lower floret a sterile lemma (or occasionally a staminate floret), the upper floret perfect; disarticulation below the



glumes. Glumes unequal; fertile lemma coriaceous to indurate, smooth in 2 species, or rugose or rugulose.

a. Bristles antrorsely scabrous.

b. Fertile lemma neither rugose nor rugulose.

c. Leaves plicate; spikelet 3-4 mm. long; bristles 1-2 cm. long. .... 1. *S. Poiretiana*.

c. Leaves not plicate, spikelet 2-2.5 mm. long; bristles 5-6 mm. long. .... 6. *S. oblongata*.

b. Fertile lemma transversely rugose or rugulose.

d. Nodes pubescent to villous. .... 9. *S. barbinodis*.

d. Nodes glabrous.

e. Bristles below spikelet 5 or more. .... 2. *S. geniculata*.

e. Bristles below spikelet 1, or 2-3 by abortion of spikelets.

f. Leaf-base rounded, not petiolate nor subpetiolate. .... 8. *S. argentina*.

f. Leaf-base gradually tapered, petiolate or subpetiolate.

g. Main panicle about 10 cm. long; bristles to about 1 cm. long. .... 10. *S. trichorhachis*.

g. Main panicle about 20-30 cm. long; bristles to about 2-3 cm. long. .... 7. *S. vulpiseta*.

a. Bristles retrorsely scabrous, at least on upper half.

h. Spikelets 2.5-3 mm. long. .... 3. *S. tenax*.

h. Spikelets 1.5 mm. long.

i. Bristles 2-5 mm. long. .... 4. *S. scandens*.

i. Bristles 1-1.5 cm. long. .... 5. *S. tenacissima*.

1. ***Setaria Poiretiana*** (Schult. in Roem. & Schult.) Kunth, Rév. Gram. 1: 47 (1829). Perennial, the culms to 1-2 m. tall, sometimes villous near the nodes, but the nodes glabrous. Leaf-sheaths papillate-hirsute; leaf-blades plicate, to 5 cm. wide, often pubescent or puberulous below, scabridulous above and beneath, the base tapering and at least subpetiolate. Panicle to 6 dm. long, the branches ascending, the rachis, branches and pedicels puberulent. Spikelets acute, 3-4 mm. long, secund on the branches, slightly plano-convex, subtended by 1 bristle 1-2 cm. long. First glume 1.5 mm. long, obtuse, 3-nerved; second glume about 2 mm. long, obtuse, 5-nerved. Sterile lemma as long as the spikelet, acute, 2-nerved. Fertile lemma slightly shorter than the sterile, acute to somewhat acuminate, not rugose but prominently longitudinally striatulate. LA PAZ: LARECAJA: San Carlos, Mapiri, 850 m., *Buchtien* 18 (GH); NOR YUNGAS: Coroico, 1560 m., *Hitchcock* 22719 (GH). COCHABAMBA: CHAPARE: Locotal, 1500 m., *Steinbach* 9019 (GH). SANTA CRUZ: SARA: Cerro del Amboró, 1000 m., *Steinbach* 2998 (GH).

2. ***S. geniculata*** (Lam.) Beauv. Ess. Agrost. 51, 178 (1812). *S. gracilis*, *S. gracilis* f. *brevispica* and *S. gracilis* f. *penicillata* of the Catalogue. Perennial, to 12 dm. tall, the culms geniculate, nodes glabrous. Leaf-sheaths glabrous; blades glabrous beneath, scabridu-



lous above, to 8 mm. wide. Panicle to 10 cm. long but usually shorter, the branches extremely short, rachis, branches and pedicels densely short-pubescent or hispid. Spikelets 2-2.5 mm. long, strongly plano-convex when mature, subtended by 5 or more bristles, these to 1 cm. long on early-season plants or 2-3 mm. long on late-season plants. First glume about 1 mm. long, obtuse, 3-nerved; second glume about 1.5 mm. long, abruptly acute at apex, about 5-nerved. Sterile lemma as long as the spikelet, about 7-nerved, subacute, enclosing a well-developed palea and often a staminate floret. Fertile lemma as long as the sterile, markedly transversely rugose, the palea-apex free at maturity. YUNGAS: *Bang* 218 (GH), 273 (GH). LA PAZ: LARECAJA: vic. Sorata, *Mandon* 1259 (GH); SUR YUNGAS: La Florida, 1840 m., *Hitchcock* 22634 (GH); Sirupaya, 2200 m., *Buchtien* 7029 (GH). COCHAMBAMBA: CERCADO: Cochabamba, 3300 m., *Shepard* 259 (GH), 2500 m., *Eyerdam* 24666 (GH); Mollemolle, 2800 m., *Steinbach* 4057 (GH). SANTA CRUZ: SARA: Buenavista, 500 m., *Steinbach* 6199 (GH).

3. *S. tenax* (L. Rich.) Desv. Opusc. 78 (1831). Perennial, to 1-2 m. tall, the nodes glabrous. Leaf-sheaths glabrous to puberulent, the margins papillate-ciliate; blades to 2 cm. wide, abruptly rounded at the base but not petiolate, scabridulous to pubescent. Panicle to 3 dm. long, the rachis short-villous, the short branches and pedicels puberulous to scabridulous. Spikelets 2.5-3 mm. long, plano-convex to suborbicular, each subtended by a single bristle 1-2 cm. long, this antrorsely scabrous at the base and retrorsely scabrid above. First glume about 1 mm. long, broadly ovate, subacute, 5-nerved; second glume 1.5-2 mm. long, subobtuse, about 7-nerved. Sterile lemma as long as the spikelet, usually with a well-developed palea. Fertile lemma as long as the sterile, smoothish at the apex, strongly transversely rugose below. LA PAZ: NOR YUNGAS: Coripata, *Hitchcock* 22685 (GH).

4. *S. scandens* Schrad. ex Schult. in Roem. & Schult. Syst. Veg. Mant. 2: 279 (1824). Annual, to 8 dm. tall, the culms geniculate at the base, the nodes glabrous. Leaf-sheaths glabrous, the margins ciliate; blades to 1 cm. wide, abruptly narrowed at the base, scabrous-pubescent above and beneath. Panicle to 10 cm. long, the branches very short, rachis short-pubescent with scattered, long, hispid hairs, branches and pedicels puberulous-scabridulous. Spikelets about 1.5 mm. long, plano-convex, subtended by 1-3 bristles retrorsely barbed on the upper portion, the bristles 2-5 mm. long. First glume about 0.75 mm. long, broadly ovate, subacute, 3-nerved; second glume nearly 1.5 mm. long, 5-nerved, subobtuse. Sterile lemma 5-nerved, as long as the spikelet with a palea half as long. Fertile lemma transversely rugose or rugulose, as long as the sterile lemma. LA PAZ: LARECAJA: Hacienda Simaco, 1400 m., *Buchtien* 5330 (GH); NOR YUNGAS: Polo-Polo, near Coroico, 1100 m., *Buchtien* 449 (GH).

5. *S. tenacissima* Schrad. ex Schult. in Roem. & Schult. Syst. Veg.



Mant. 2: 279 (1824). Annual, to 2 m. tall, nodes glabrous. Leaf-sheaths glabrous below, scabrous above; blades to 1 cm. wide, pubescent and scabrous above and beneath. Panicle to 2 dm. long, the branches short (less than 1 cm.), rachis pubescent to hispid, branches and pedicels pubescent. Spikelets plano-convex, 1.5 mm. long, each subtended by a retrorsely scabrous bristle 1-1.5 cm. long. First glume about 1 mm. long, 3-nerved, subobtuse; second glume nearly 1.5 mm. long, 5-nerved. Sterile lemma 1.5 mm. long, 3-5-nerved. Fertile lemma as long as the sterile or slightly shorter, rugulose on the lower portion. LA PAZ: LARECAJA: Hacienda Simaco, 1400 m., *Buchtien* 5329 (GH); NOR YUNGAS: Coroico, 1560 m., *Hitchcock* 22717 (GH).

6. *S. oblongata* (Griseb). Parodi in *Physis*, 9: 38 (1928). Perennial, to 1.5 m. tall, nodes glabrous. Leaf-sheaths glabrous below, scabrid above; blades long, to 1 cm. wide, scabrous above and beneath. Panicle to 1 dm. long, the branches very short, rather lax, rachis short-villous, branchlets and pedicels puberulent. Spikelets 2-2.5 mm. long, plano-convex, each subtended by a single antrorsely scabrous bristle 5-6 mm. long. First glume 1.5 mm. long, subobtuse, 5-nerved; second glume about 2 mm. long, 7-nerved. Sterile lemma as long as the spikelet, 5-nerved. Fertile lemma as long as the sterile, smooth, shining. LA PAZ: LARECAJA: vic. Sorata, *Mandon* 1260 (Hitchcock).

7. *S. vulpiseta* (Lam.) Roem. & Schult. *Syst. Veg.* 2: 495 (1817). Perennial, culms to 2 m. tall, nodes glabrous. Leaf-sheaths somewhat carinate, glabrous below, scabrous to pubescent above; blades basally petiolate or subpetiolate, to 3 cm. wide, scabrous above and beneath. Panicle to 3 dm. long, the ascending branches to 3-4 (occasionally nearly 5) cm. long, rachis and branches villous, pedicels puberulent. Spikelets to 2.5 mm. long, plano-convex, each subtended by 1-2 antrorsely scabrous bristles 2-3 cm. long. First glume about 1 mm. long, 3-5-nerved; second glume about 2 mm. long, 7-nerved. Sterile lemma as long as the spikelet, 5-nerved, with a well-developed palea. Fertile lemma 2.5 mm. long, smooth near the apex, markedly rugose below. SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 1178 (GH); Río Surutú, 400 m., *Steinbach* 6842 (GH).

8. *S. argentina* Herrm. in *Beitr. Biol. Pflanz.* 10: 54 (1910). Perennial, to 10 dm. tall, the nodes glabrous. Leaf-sheaths glabrous below, sparsely papillate-hirsute above, long-ciliate; blades abruptly rounded at base, to 1 cm. wide, papillate-pubescent above and beneath. Panicle to 12 cm. long, the branches very short, the rachis, branches and pedicels puberulent. Spikelets plano-convex, to 2.5 mm. long, each subtended by 1 antrorsely scabrous bristle (occasionally 2) 8-10 mm. long. First glume nearly 1.5 mm. long, subacute, 3-nerved; second glume about 2 mm. long, acute, 5-nerved. Sterile lemma 2.5 mm. long, acute. Fertile lemma nearly as long as the sterile, smooth above, rugulose below. LA PAZ: MURILLO: Cotaña, 2450 m., *Buchtien* 286 (GH); LARECAJA: vic. Sorata, *Mandon* 1262 (GH). COCHABAMBA:



CERCADO: near Cochabamba, *Hitchcock* 22803 (GH); Valle de Cochabamba, 2700 m., *Steinbach* 9714 (GH).

9. *S. barbinodis* Herrm. in Beitr. Biol. Pflanz. 10: 60 (1910). Perennial, to 10 dm. high, the nodes pubescent to villous. Leaf-blades linear, long, to 7 mm. wide, scabrid above and beneath, with occasional hairs but hardly pubescent. Panicle to 15 cm. long, interrupted below, the branches short, rachis short-pubescent with few to many long hairs intermixed, the branches and pedicels short-pubescent. Spikelets subglobose, to 3 mm. long, each subtended by 1 antrorsely scabrous bristle to 1 cm. long. First glume about 2 mm. long, acute, 3-nerved; second glume 2.5 mm. long, broad, shortly apiculate, 5-7-nerved. Sterile lemma 3 mm. long, shortly apiculate, 5-nerved. Fertile lemma slightly shorter than the sterile lemma, rugulose to rugose. LA PAZ: LARECAJA: vic. Sorata, *Mandon* 1261 (US; type-number).

10. *S. trichorhachis* (Hack.) R. C. Foster, comb. nov. *S. Liebmannii* f. *trichorhachis* Hack. in Fedde, Rep. Nov. Spec. 8: 46 (1910). Perennial, to 8 dm. tall, the nodes glabrous. Leaf-sheaths glabrous below, sparsely pubescent above, ciliate; blades gradually tapered and subpetiolate at base, to 1.5 cm. wide, scabrous above and beneath. Panicle to 8 cm. long, the branches very short, rachis short-pubescent with numerous longer hairs intermixed, branches and pedicels puberulent. Spikelets plano-convex, 3 mm. long, each subtended by 1 antrorsely scabrous bristle about 1 cm. long. First glume about 1 mm. long, subacute, 5-nerved; second glume 2 mm. long, obtuse, 7-nerved. Sterile lemma about 2.5 mm. long, 5-nerved, acute. Fertile lemma 2.5 mm. long, rugose below, rugulose to smooth above. Without locality: *Bang* 2160 (GH).

## 92. *Pennisetum* L. Rich.

Perennials, to 5 m. tall. Leaf-blades flat, sparsely pubescent to glabrous and scabridulous, petiolate to subpetiolate. Inflorescence more or less spicate in appearance, the spikelets solitary to few in a fascicle, sessile or subsessile, subtended by a ring of equal to unequal, basally plumose or antrorsely puberulent bristles, 2-flowered, the lower floret a sterile lemma or sometimes a staminate floret, the upper floret perfect; disarticulation below the glumes. Glumes unequal. Fertile lemma chartaceous to herbaceous, mostly smooth.

- a. Culm-nodes villous. .... 4. *P. latifolium*.
- a. Nodes glabrous.
  - b. Bristles plumose.
    - c. Longest bristles 1.5 cm. long; spikelets 7 mm. long. .... 1. *P. setosum*.
    - c. Longest bristles 4 cm. long; spikelets to 1.2 cm. long. .... 2. *P. villosum*.
  - b. Bristles not plumose.



- d. Longest bristles about as long as the spikelet (4-5 mm.) .....  
 ..... 5. *P. mutilatum*.
- d. Longest bristles much longer than the spikelet (about 1.2 cm.  
 long).
- e. Second glume 2-3 mm. long; spikelet to 7 mm. long. ....  
 ..... 6. *P. chilense*.
- e. Second glume less than 1 mm. long; spikelet to 5 mm. long.  
 ..... 3. *P. tristachyum*.

1. ***Pennisetum setosum*** (Swartz) L. Rich. in Pers. Synops. Pl. 1: 72 (1805). Culms 1-2 m. tall, nodes glabrous. Leaf-sheaths glabrous; blades to 4 dm. long and 1.8 cm. wide, pubescent or scabridulous above and beneath. Inflorescence to 25 cm. long, purplish. Spikelets about 4 mm. long. Bristles in 2 series; outer series shorter to slightly longer than the spikelet, antrorsely puberulent; inner series about twice the length of the spikelet (1 bristle much longer than the rest, to 1.5 cm. long), densely silky-plumose basally. First glume about 0.5 mm. long, sometimes absent; second glume 3.5 mm. long, longer than the sterile lemma, acute, puberulous on the upper portion. Sterile lemma about 3 mm. long, obtuse, puberulous, the apex finely ciliolate. Fertile lemma about 2.5 mm. long, the apex penicillate. LA PAZ: NOR YUNGAS: Coripata, *Bang* 2168 (GH).

2. ***P. villosum*** R. Br. in Fresen. in Mus. Sencken. 2: 134 (1837). Culms to 0.5 m. tall, nodes glabrous. Leaf-sheaths glabrous; blades 3-5 mm. wide, scabridulous beneath, occasionally sparsely pilose above. Inflorescence to 8 cm. long, sometimes pale-tawny. Spikelets to 1.2 cm. long, 1-4 in a shortly pedunculate fascicle, the peduncle densely short-villous at the base. Bristles to 4 (-5) cm. long, the outer shorter and sparsely or not at all plumose, the inner long and plumose. First glume about 0.5 mm. long; second glume about 3.5 mm. long, long-acute. Sterile lemma about 1 cm. long, long-acute, scabridulous on the nerves above the middle. Fertile lemma 1 mm. shorter than the sterile, acuminate. CHUQUISACA: OROPEZA: outskirts of Sucre, 2700 m., *Cárdenas* 4116 (GH).

3. ***P. chilense*** (Desv.) Jacks. ex R. E. Fries in Nov. Act. Soc. Sci. Upsal. (ser. 4) 1: 172 (1905). Culms 1-2 m. tall, from a distinct rhizome, the nodes glabrous. Leaf-sheaths glabrous; blades scabrous beneath, sometimes scabridulous above, to 1 cm. wide. Inflorescence to 2 dm. long, grayish to purplish. Spikelets to 7 mm. long. Bristles of varying lengths, from the length of the spikelet to 1.5 cm. long, antrorsely puberulent, none plumose. First glume nearly 1 mm. long, obtuse; second glume about 2-3 mm. long, subacute, sometimes ciliolate. Sterile lemma 6 mm. long, scabridulous on the upper portion, long-acute. Fertile lemma 6 mm. long, long-acute. LA PAZ: MURILLO: La Paz, 3700 m., *Buchtien* 81 (GH), 161 (GH), *Bang* 55 (GH), *Mandon* 1265 (GH); Palca, 3700 m., *Hitchcock* 22583 (GH). COCHABAMBA: CHAPARE: Sacaba, 2900 m., *Steinbach* 8809 (GH). POTOSÍ: SUR



CHICHAS: Oploca, *Hitchcock* 22898 (GH). TARIJA: CERCADO: Concepción, 1900 m., *Fiebrig* 2595 (GH).

4. *P. latifolium* Spreng. Syst. Veg. 1: 302 (1825). Culms to 1-3.5 dm. tall, the nodes villous. Leaf-sheaths glabrous to pilose on the upper portion, or papillate-hirsute, the margins hispid-ciliate; blades to 35 cm. long and 5 cm. wide, usually narrower, scabridulous above and beneath. Inflorescence to 10 cm. long, greenish. Spikelets about 4.5 mm. long, acute. Bristles few, not plumose, shorter than or as long as the spikelet, 1 bristle to 1 cm. long. First glume 0.5 mm. long, subacute; second glume about 1 mm. long, ovate, subacute, ciliolate at the apex. Sterile glume as long as the spikelet, acute, scabrid-puberulous. Fertile lemma slightly shorter than the sterile lemma, subacuminate, slightly scabridulous at the apex. LA PAZ: LARECAJA: vic. Sorata; Lucmapampa, Iminapi, 2600 m., *Mandon* 1263 (GH). COCHABAMBA: CERCADO: west of Cochabamba, *Hitchcock* 22847 (GH); CHAPARE: Locotal, 1500 m., *Steinbach* 9014 (GH).

5. *P. mutilatum* (O. Ktze.) Hack. ex Index Kew. Suppl. 2: 137 (1904). *P. sagittatum* Henr. in Blumea, Suppl. 1: 229 (1937). Culms 1-2 m. tall, nodes glabrous. Leaf-sheaths sparsely papillate-hirsute to glabrous; blades glabrous or puberulent at base when young, to 1.5 cm. wide. Inflorescence to 10 cm. long. Spikelets about 4 mm. long. Bristles few, short, equaling or slightly exceeding the spikelet, not plumose. First glume between 0.5-1 mm. long, obtuse; second glume 2-3 mm. long, acute, puberulous above. Sterile lemma nearly as long as the spikelet, acute, antrorsely puberulent on entire dorsal surface. Fertile lemma to 4 mm. long, occasionally scabridulous near the acute apex. LA PAZ: LARECAJA: vic. Sorata; between Munaypata and Challasuyo, 2650 m., *Mandon* 1264 (GH).

6. *P. tristachyum* (HBK.) Spreng. Syst. Veg. 1: 302 (1825). *P. tristachyum* subsp. *boliviense* Chase in Contrib. U. S. Nat. Herb. 24: 486 (1927). Culms 2-6 m. tall, branched, nodes glabrous. Leaf-sheaths glabrous; blades to 4 dm. long and 3 or more cm. wide, petiolate, the petioles villous and the blades sparsely villous above and beneath at the base. Inflorescence to 10 cm. long. Spikelets about 5 mm. long, acute. Bristles unequal in length, the longest to 1.5 cm. long, not plumose. First glume about 0.25 mm. long; second glume less than 1 mm. long. Sterile lemma as long as the spikelet, acuminate, scabridulous toward the apex. Fertile lemma slightly shorter than the sterile lemma, acuminate, glabrous or nearly so. LA PAZ: NOR YUNGAS: Coroico, 1100 m., *Buchtien* 451 (GH); Colapampa, *Bang* 2340 (GH). SANTA CRUZ: SARA: Cerro Hosana, 1300 m., *Steinbach* 3379 (GH); Cerro La Negra, 1800 m., *Steinbach* 8172 (GH).

### 93. *Cenchrus* L.

Annual or perennial, often to 1 m. tall. Inflorescence a terminal raceme. Spikelets 1-4 in a group, surrounded by an involucre (modi-



fied sterile branchlets) forming spiny burs, the spines usually retrorsely barbed; disarticulation below the burs. Spikelets 2-flowered, the lower floret a sterile lemma, the upper floret perfect. Glumes unequal, the first glume sometimes obsolete.

- a. Burs with 1 spikelet; involucre lobes united at the base only. .... 1. *C. myosuroides*.
- a. Burs with more than 1 spikelet; involucre lobes united to about the middle.
  - b. Burs with a basal ring of bristles. .... 4. *C. pauciflorus*.
  - c. Involucre lobes interlocking; burs about 4 mm. wide. .... 2. *C. viridis*.
  - c. Involucre lobes not, or seldom, interlocking; burs 5-7 mm. wide. .... 3. *C. echinatus*.
  - b. Burs without a basal ring of bristles. .... 4. *C. pauciflorus*.

1. ***Cenchrus myosuroides*** HBK. Nov. Gen. & Sp. 1: 115 (1816). Perennial, rather woody, to 1.5 m. tall, glaucous, glabrous. Leaf-blades 5-12 mm. wide. Raceme to 25 cm. long, dense; burs 1-flowered, to 5 mm. wide, the lobes united at the base only, free above, the base hispidulous, the outer bristles of the involucre shorter than the inner, both series erect, the inner about equaling the spikelet. Spikelet about 5 mm. long, acute. First glume about 2 mm. long, broadly ovate, acute, 1-nerved; second glume 3.5-4 mm. long, 5-nerved, the midrib prominent. Sterile lemma 4.5 mm. long, similar to second glume. Fertile lemma 5 mm. long, acute; palea almost as long, narrower. COCHABAMBA: TARATA: Anzaldo, 3000 m., *Cárdenas* 2425 (GH); CERCADO: Cochabamba, *Hitchcock* 22806 (GH); Cochabamba Railway Station, 2560 m., *Cárdenas* 2391 (GH); Taquiña, 2700 m., *Steinbach* 9801 (GH).

2. ***C. viridis*** Spreng. Syst. Veg. 1: 301 (1825). Annual, up to 1 m. tall, glabrous. Leaf-blades to 12 mm. wide. Raceme to 10 cm. long, rather dense; burs usually 3-flowered, subglobose, 4 mm. wide (excluding the bristles), lobes interlocked at maturity, the base pubescent. Spikelet about 7 mm. long, acute. First glume narrowly ovate, 3 mm. long, 1-nerved; second glume 5 mm. long, acute, 5-nerved. Sterile lemma to 6 mm. long, acute, several-nerved. Fertile lemma slightly longer. LA PAZ: SUR YUNGAS: Guanay, *Rusby* (M. E.) 190 (*Hitchcock*).

3. ***C. echinatus*** L. Sp. Pl. 1050 (1753). Annual, to 6 dm. high. Leaf-blades to 8 mm. wide, sparsely pilose above near the base. Raceme to 10 cm. long; burs usually 4-flowered, lobes united to the middle, seldom interlocking at maturity, the tips spinose, 5-7 mm. wide (excluding the bristles), pubescent. Spikelet about 7 mm. long. First glume ovate, 2 mm. long, 1-nerved, acute; second glume 4 mm. long, 5-nerved. Sterile lemma 5 mm. long. Fertile lemma 5 mm. long, long-acute. LA PAZ: NOR YUNGAS: Milluguaya, 1300 m., *Buchtien*



4171 (GH). SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 6980 bis (GH): Río Surutu, 400 m., *Steinbach* 5576 (GH), 6838 (GH).

4. *C. pauciflorus* Benth. Bot. Voy. Sulphur, 56 (1840). Annual, often in mats, to 9 dm. tall. Leaf-blades to 7 mm. wide. Raceme to 8 cm. long; burs usually 2-flowered, 4-6 mm. wide, pubescent, the lobes united to the middle. Spikelet about 6 mm. long. First glume about 2 mm. long, acute, 1-nerved; second glume 4 mm. long, 3-nerved. Sterile and fertile lemmas as long as the spikelet, several-nerved. LA PAZ: LARECAJA: vic. Sorata; San Pedro, 2650 m., *Mandon* 1267 (GH).

#### 94. *Olyra* L.

Perennials, often very tall, often rather woody, plants monoecious. Leaf-blades variable in size, often very large, mostly glabrous, petiolate or subpetiolate. Inflorescence a compact to lax panicle; pistillate spikelets at ends of branches, the staminate spikelets below, these pedicellate, smaller, or the upper branches all with pistillate spikelets and the lower branches all staminate. Pistillate spikelets: rather large, 2-flowered, the lower floret a sterile lemma, the first glume absent, the fruit indurate or bony; disarticulation below the glumes. Staminate spikelets: both glumes and the sterile lemma absent, the fertile lemma and palea membranaceous.

a. Leaf-blades oblong- or triangular-deltoid.

b. Panicle short, 2-3 cm. long; glume 2-3 mm. long, not caudate; fruit glabrous. .... 1. *O. lateralis*.

b. Panicle to 10 cm. long; glume to 2 cm. long, caudate; fruit pubescent. .... 5. *O. ciliatifolia*.

a. Leaf-blades not deltoid.

c. Fruit pitted.

d. Glume to 1 cm. long, densely pubescent externally. .... 6. *O. micrantha*.

d. Glume to 3 cm. long; externally glabrous. .... 3. *O. heliconia*.

c. Fruit not pitted.

e. Glume 2-4 cm. long, caudate.

f. Glume about 2 cm. long. .... 7. *O. latifolia*.

f. Glume about 4 cm. long. .... 4. *O. Buchtienii*.

e. Glume 1 cm. long, not caudate. .... 2. *O. ecaudata*.

1. *Olyra lateralis* (Presl) Chase in Proc. Biol. Soc. Wash. 21: 179 (1908). Straggling. Leaf-blades oblong-deltoid, to 4 cm. long and 1.2 cm. wide, the base truncate to subcordate, glaucous beneath, puberulent above when young. Panicle 2-3 cm. long, few-branched, the branches usually whorled. Pistillate spikelet: ovoid, 2-3 mm. long, glabrous; glume with 3 prominent nerves, sterile lemma similar; fruit shining, not pitted, glabrous. Staminate spikelet: linear, acute, 2.5-3 mm. long, puberulent at base. LA PAZ: LARECAJA: San Carlos, Mapiri, 850 m., *Buchtien* 25 (GH); Hacienda Simaco, 1400 m., *Buchtien* 5333 (GH).



2. *O. ecaudata* Doell in Mart. Fl. Bras. 2(2): 326 (1877). Erect. Leaf-blades oblong, to 20 cm. long and 2.5 cm. wide, scabrid above. Pistillate spikelet: 6-8 mm. long, oblong, acuminate, not caudate. Staminate spikelet: subulate, the lemma cuspidate. PANDO: COBIJA: *Ule* 9146 (Hitchcock).
3. *O. heliconia* Lindm. in Sv. Vet. Akad. Handl. 34(6): 11 (1900). Stout, little-branched, to 2 m. tall. Leaf-blades oblong, to 35 cm. long and 8 cm. wide, the subtruncate base asymmetric, sparsely puberulent when young. Panicle to 30 cm. long, the few branches in 2-3 distant whorls. Pistillate spikelet: glume to 3 cm. long, long-caudate, sterile lemma to 2 cm. long, long-acute to subcaudate, both puberulent within and glabrous externally; fruit to 1 cm. long, glabrous but conspicuously and regularly pitted. Staminate spikelet: about 1 cm. long, narrowly subulate, often purple. LA PAZ: NOR YUNGAS: Coroico, 1560 m., *Hitchcock* 22720 (GH); Polo-Polo, 1100 m., *Buchtien* 450 (GH). SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 2010 (GH).
4. *O. Buchtienii* Hack. in Fedde, Rep. Sp. Nov. 11: 20 (1912). To 1.5 m. tall. Leaf-blades oblong-lanceolate, to 30 cm. long and 7 cm. wide, the base subtruncate, somewhat asymmetric. Panicle to 15 cm. long, few-branched. Pistillate spikelet: glume and sterile lemma long-caudate, glume to 4 cm. long; glume and lemma puberulent within, scabridulous-puberulent externally; fruit 1 cm. long, glabrous. Staminate spikelet: narrowly ellipsoid, to 4 mm. long, sparsely puberulent. LA PAZ: LARECAJA: San Carlos, Mapiri, 800 m., *Buchtien* 40 (GH).
5. *O. ciliatifolia* Raddi, Agrost. Bras. 19 (1823). Seldom 1 m. tall. Leaf-blades triangular-deltoid, to 10 cm. long and 4 cm. wide, the truncate base asymmetric, glabrous, or pubescent at base when young. Panicle to 10 cm. long, at least the lower branches in whorls. Pistillate spikelet: glume 2 cm. long, very slender-caudate, the sterile lemma similar but shorter, glume and lemma glabrous internally and externally; fruit to 7 mm. long, pubescent. Staminate spikelet: to 7 mm. long, very slender, glabrous. BENI: YACUMA: Lago Rogagua, *Rusby* (M. E.) 1669 (US).
6. *O. micrantha* HBK. Nov. Gen. & Sp. 1: 199 (1816). Very large, to 5 m. tall. Leaf-blades oblong-lanceolate, to 30 cm. long and 10 cm. wide, the base rounded but not cordate, glabrous. Panicle to 30 cm. long. Pistillate spikelet: glume to 1 cm. long, long-caudate, densely pubescent; sterile lemma similar but much shorter; glume and lemma minutely puberulent internally; fruit 3 mm. long, glabrous but regularly and deeply pitted. Staminate spikelet: very narrow, 7 mm. long, the lemma somewhat caudate, glabrous. SANTA CRUZ: ICHILO: Río Vibora, 350 m., *Steinbach* 7572 (GH). LA PAZ: LARECAJA: San Carlos, Mapiri, 750 m., *Buchtien* 76 (GH).
7. *O. latifolia* L. Syst. Nat. (ed. 10) 2: 1261 (1759). To 5 m. tall.



Leaf-blades lanceolate-oblong, to 30 cm. long and 8 cm. wide, glabrous, acuminate, the base asymmetric. Panicle to 15 cm. long. Pistillate spikelet: glume to 2 cm. long, long-caudate, minutely puberulent externally, hispid-ciliate near the base, internally densely puberulent above the middle; sterile lemma similar but shorter; fruit 5 mm. long, shining, apparently somewhat rugose above the middle, glabrous. Staminate spikelet: slender, to 7 mm. long, the lemma short-caudate. LA PAZ: LARECAJA: Mapiri, *Buchtien* 1155 (Hitchcock).

### 95. *Imperata* Cyrillo

Caespitose, rhizomatous perennials, the rhizome scaly, the culms unbranched, to 1-2 m. tall. Leaf-sheaths often ciliate, otherwise glabrous; leaf-blades flat or involute, glabrous beneath, pubescent to hirsute above (especially near the base) when young. Inflorescence a panicle of racemes. Spikelets 2-flowered, the lower floret a sterile lemma, the upper floret perfect, pedicellate, awnless; disarticulation below the glumes. Glumes mostly subequal, membranaceous to hyaline, more or less densely villous, the hairs much exceeding the spikelet. Sterile lemma and fertile lemma and palea hyaline, thin.

a. Leaf-blades flat.

b. Spikelet 4 mm. long. .... 1. *I. brasiliensis*.

b. Spikelet 2 mm. long. .... 3. *I. minutiflora*.

a. Leaf-blades involute (the uppermost sometimes flat). ....  
..... 2. *I. tenuis*.

1. *Imperata brasiliensis* Trin. in Mém. Acad. St. Pétersb. (ser. 6) Math. Phys. Nat. 2: 331 (1832). To 1 m. tall. Leaf-blades flat, to 1.8 cm. wide, mostly glabrous, the margins scabrid. Panicle about 10 cm. long. Spikelets 4 mm. long, glumes acute, the first glume somewhat shorter than the second. BENI: YACUMA: Reyes, *White* (M. E.) 1535 (Hitchcock).

2. *I. tenuis* Hack. in DC. Monogr. Phan. 6: 689 (1889). Plants 0.8-2 m. tall. Leaves mostly involute, the uppermost occasionally flat. Panicle to 2 dm. long. Spikelets 4 mm. long, glumes long-acute, the first glume shorter than the second. SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 1824 (GH), 6928 (GH); Río Dolores, 450 m., *Steinbach* 1933 (GH).

3. *I. minutiflora* Hack. in DC. Monogr. Phan. 6: 100 (1889). Plant 0.4-1 m. tall. Leaf-blades to 4 mm. wide. Panicle to 2-3 dm. long. Spikelets 2 mm. long, glumes acute, hairs mostly basal. SANTA CRUZ: SARA: Curichi, 400 m., *Steinbach* 2410 (GH); Río Guendá, 400 m., *Steinbach* 6894 (GH).

### 96. *Saccharum* L.

*Saccharum officinarum* L. Sp. Pl. 54 (1753). Very large perennial, to 5 m. tall, the culms 2-3 cm. thick. Leaf-sheaths closely imbricate,



the lowermost falling from the culms; blades to 6 cm. wide, midrib very prominent. Inflorescence a plumose panicle to 6 dm. long, the racemes drooping, the rachis disarticulating. Spikelets about 3-4 mm. long, awnless, paired, both with a perfect floret, one sessile, a ring of long hairs at base of each spikelet, 2-flowered. Glumes subequal, acute, subindurate. COCHABAMBA: CHAPARE: Espíritu Santo, *Buch-tien* 2514 (Hitchcock).

### 97. *Eriochrysis* Beauv.

Erect perennials to 1-2 m. tall. Leaf-blades flat to involute, glabrous to sparsely or densely pubescent. Inflorescence a terminal continuous or interrupted panicle of racemes, the raceme-rachis ultimately disarticulating below the spikelets. Spikelets paired, perfect spikelets sessile, pistillate spikelets pedicellate, both long-villous at the base. Glumes subequal, rather indurate; lemma somewhat hyaline; palea hyaline.

Leaf-blades flat, densely velvety-pubescent; panicle dense, almost uninterrupted, deep golden-brown. .... 1. *E. cayennensis*.  
 Leaf-blades usually involute, glabrous or sparsely pubescent; panicle obviously interrupted, pale to medium-brown. ....  
 ..... 2. *E. Warmingiana*.

1. ***Eriochrysis cayennensis*** Beauv. Ess. Agrost. 8 (1812). Unbranched plant, 1-2 m. tall. Panicle to 12 cm. long, the individual racemes very short. Spikelets about 3 mm. long. First glume obtuse, long-villous on upper portion and along margins; second glume subacute, convex, sparsely long-villous on upper keel. SANTA CRUZ: SARA: Portachuelo, *Steinbach* 1974 (GH); Buenavista, 450-500 m., *Steinbach* 5174 (GH), 6915 (GH).

Occasionally, an intermediate with a more interrupted inflorescence, but almost the typical coloring, will be found, such as *Steinbach* 6975 bis (GH), from Buenavista.

2. ***E. Warmingiana*** (Hack.) Kuhl. in Comm. Linhas Telegr. Estrat. Matto Grosso, 67: 29 (1922). Caespitose, about 1 m. tall, the nodes pubescent. Panicle about 15 cm. long, the racemes 2-4 cm. long. Spikelets to 5 mm. long. First glume long-acute, the upper portion short-puberulent, with a few long hairs, otherwise glabrous; second glume convex, puberulent, with a few long lax hairs on the upper margin. SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 1916 (GH), 7032 (GH).

### 98. *Erianthus* Beauv.

Perennials, 1-3 m. tall, the nodes pubescent to long-villous. Leaf-sheaths sparsely to densely pubescent; leaf-blades flat, pubescent or scabrous. Inflorescence a terminal, rather dense, panicle of racemes. Spikelets perfect, paired, 1 sessile, 1 pedicellate, the pedicel villous



in part, the raceme-rachis disarticulating below the spikelets. Glumes equal or subequal, silky-villous, at least at the base, sterile lemma hyaline, fertile lemma hyaline and long-awned; palea small and hyaline.

Leaf-blades to 1.5 cm. wide; panicle light-colored, 3-4 dm. long. ....  
..... 1. *E. Trinii*.

Leaf-blades less than 1 cm. wide; panicle usually purplish, 1.5-2.5 dm. long. .... 2. *E. angustifolius*.

1. **Erianthus Trinii** (Hack.) in DC. Monogr. Phan. 6: 135 (1889). Plants 2-3 m. tall, leaf-blades to 1.5 cm. wide. Panicle to 3-4 dm. long, the base usually enclosed in the inflated upper leaf-sheath, the culms pubescent below the panicle. Spikelets to 7 mm. long (excluding the awn). Glumes acute to slightly bidentate, the upper portion soft-pubescent. Awn of fertile lemma about 1 cm. long, not geniculate. LA PAZ: NOR YUNGAS: Coripata, *Hitchcock* 22682 (*Hitchcock*).

2. **E. angustifolius** Nees, Agrost. Bras. 316 (1829). Plants about 1 m. tall, leaf-blades 4-8 mm. wide. Panicle 1.5-2.5 dm. long, the base mostly free from the leaf-sheath, culm densely pubescent below panicle. Spikelets to 8 mm. long (excluding the awn). Glumes bidentate, short-pubescent on upper portion. Awn of fertile lemma about 1 cm. long, not geniculate. LA PAZ: NOR YUNGAS: San José, 1500 m., *Hitchcock* 22737 (GH).

### 99. *Andropogon* L.

Perennials, to 1-2 m. tall. Inflorescence a panicle of racemes, solitary or 2 or more at apices of branches, the common peduncle usually enclosed by a sheathing spathe. Spikelets 2-flowered, with the lower floret a sterile hyaline lemma, paired on a jointed rachis, 1 spikelet sessile and perfect, the other pedicellate, staminate or neuter, or greatly reduced; disarticulation below the glumes. Glumes of perfect spikelet subequal or somewhat unequal, coriaceous, the first glume bicarinate, the margins inflexed. Fertile lemma hyaline, awned or awnless. Pedicellate spikelet sometimes with the first glumes aristate, sometimes reduced to a pedicel, the pedicels often conspicuously villous.

a. Spikelets awnless.

b. Rachis-joints clavate, with a cupular hollow at the summit. ....  
..... 2. *A. virgatus*.

b. Rachis-joints not clavate, the summit without a cupular hollow.

c. First glume of sessile spikelet glabrous.

d. Culms 1-2 m. tall; leaf-blades long-attenuate, not boat-shaped at the tip. .... 9. *A. bicornis*.

d. Culms 1 m. tall or less; leaf-blades not long-attenuate, boat-shaped at the tip. .... 11. *A. Selloanus*.

c. First glume of sessile spikelet not glabrous.

e. Glume pilose on and near keels. .... 6. *A. Hassleri*.

e. Glume merely ciliolate on keels. .... 10. *A. leucostachyus*.



- a. Spikelets awned.
  - f. Rachis-joints clavate, with a cupular hollow at the summit.
    - g. First glume of sessile spikelet glabrous.
      - h. Racemes spreading, rachis flexuose. .... 1. *A. condensatus*.
      - h. Racemes appressed, rachis straight.
        - i. Sessile spikelet 4(-5) mm. long. .... 4. *A. tener*.
        - i. Sessile spikelet 5-6 mm. long. .... 5. *A. cirratus*.
    - g. First glume of sessile spikelet not glabrous.
      - j. Sessile spikelet 9-10 mm. long; glume of sterile spikelet long-aristate. .... 3. *A. hirtiflorus*.
      - j. Sessile spikelet 5 mm. long; glume of sterile spikelet not aristate. .... 4. *A. tener hirtiglumis*.
  - f. Rachis-joints not clavate, not with a cupular hollow at the summit.
    - k. First glume of sessile spikelet pilose on keels. .... 7. *A. saccharoides*.
    - k. First glume of sessile spikelet glabrous.
      - l. Glume with a dorsal pit. .... 8. *A. altus*.
      - l. Glume not pitted.
        - m. Leaf-blades glabrous.
          - n. Blades less than 10 mm. wide at base, base not cordate. .... 12. *A. lateralis*.
          - n. Blades 15-20 mm. wide at base, base cordate. .... 13. *A. cordatus*.
        - m. Leaf-blades pubescent on both surfaces. .... 14. *A. leptocladus*.

1. **Andropogon condensatus** HBK. Nov. Gen. & Sp. 1: 188 (1816). Culms to 1 m. or more high. Leaves glabrous, the blades flat, linear, acute to subobtuse. Inflorescence much-branched, corymbose, the rachises flexuose, the rachis-joints clavate, cupular at the apex, unilaterally long-pilose. Sessile spikelets 4.5-5 mm. long, the glumes subequal, the first glume strongly bicarinate, the keels scabrid on upper portion; awn slender, flexuose, to 1 cm. long. Pedicellate spikelets reduced, the pedicels curved and unilaterally long-pilose. YUNGAS: *Bang* 276 (GH). LA PAZ: NOR YUNGAS: Milliguaya, 1300 m., *Buchtien* 38 (GH); Polo-Polo, near Coroico, 1100 m., *Buchtien* 205 (GH); SUR YUNGAS: La Florida, 1840 m., *Hitchcock* 22639 (GH). SANTA CRUZ: SARA: Buenavista, 400-500 m., *Steinbach* 3302 (GH), 5165 (GH), 6809 (GH), 6951 (GH), 6952 (GH), 6953 (GH).

2. **A. virgatus** Desv. ex Hamilt. Prodr. Pl. Ind. Occ. 9 (1825). Culms to 2 m. high. Leaf-blades long, narrowly linear, glabrous above, pubescent beneath (glabrate in old leaves?). Inflorescence elongate, much-branched, the rachis straight, spikelets densely appressed and ascending, rachis-joints shortly ciliate or ciliolate on the 2 margins, clavate with a cupular apex, racemes 1-2 cm. long, somewhat enclosed in the subtending red-brown or purplish spathes. Sessile spikelets



about 2.5-3 mm. long, the first glume strongly bicarinate, the keels scabrid-ciliolate, otherwise glabrous; lemma awnless. Pedicellate spikelets not reduced, about 2.5 mm. long, the glumes ciliolate on the keels, pedicels puberulent. SANTA CRUZ: SARA: Buenavista, 450-500 m., *Steinbach* 5344 (GH), 6945 (GH).

3. *A. hirtiflorus* (Nees) Kunth, *Rév. Gram.* 2: 569 (1832). *A. Riedelii* of the Catalogue. Culms to 1 m. tall, reddish. Leaves flat, linear, glabrous. Inflorescence much-branched, the rachis straight, racemes and spikelets ascending, rachis-joints pubescent, clavate, with a cupular apex, racemes 6-10 cm. long. Sessile spikelets to 9-10 mm. long, the first glume villous, aristate; lemma awned, the awn twisted, about 1-1.5 cm. long. Pedicellate spikes reduced, aristate, the pedicels pubescent. LA PAZ: LARECAJA: vic. Sorata; between Toquirani and San Pedro, 2700 m., *Mandon* 1385 (GH); between Choquecoa and Mt. Illampu, 3600 m., *Mandon* 1275 (GH); SUR YUNGAS: Chulumani, 1600 m., *Hitchcock* 22658 (GH).

4. *A. tener* (Nees) Kunth, *Rév. Gram.* 2: 565 (1832). Densely tufted, the culms to 1 m. tall. Leaf-blades flat or involute, sometimes sparsely long-pilose above. Inflorescence very slender, the rachis straight, rachis-joints clavate, ciliate around the cupular apex and on 1 side, or nearly glabrous. Sessile spikelets 4-5 mm. long, the first glume glabrous or ciliolate on the keels; awn to 1 cm. long. Pedicellate spikelet reduced, shortly aristate. LA PAZ: LARECAJA: Sorata, *Mandon* 1383 (GH); Catarguata, 2700 m., *Mandon* 1381 (GH). TARIJA: ARCE: Camacho, 2500 m., *Fiebrig* 2859 (GH).

4a. *A. tener* subvar. *hirtiglumis* Henr. in *Meded. Rijks Herb. Leiden*, no. 40: 42 (1921). Resembling *A. tener* in most respects, but with the first glume of the sessile spikelet densely pilose. TARIJA: AVILES: Pinos, 2300 m., *Fiebrig* 3154 (GH; type-number).

5. *A. cirratus* Hack. in *Flora*, 68: 119 (1885). Culms to 7 dm. tall, tufted. Leaf-blades flat, linear, scabrid. Inflorescence narrow, the rachis straight, racemes appressed-ascending, rachis-joints unilaterally long-ciliate, clavate, with a cupular apex. Sessile spikelets to 5-6 mm. long, the first glume glabrous; awn to 1 cm. long. Pedicellate spikelets somewhat reduced, the first glume long-aristate, pedicels long-ciliate. TARIJA: CERCADO: Tucumilla, 2200 m., *Fiebrig* 2787 (GH).

6. *A. Hassleri* Hack. in *Bull. Herb. Boiss.* (ser. 2) 4: 266 (1904). Culms about 1 m. tall, the nodes glabrous. Linear leaf-blades scabridulous beneath. Inflorescence oblong, to 12 cm. long, pale, silky-villous, racemes appressed-ascending, rachis-joints long-silky-villous, especially on the margins. Sessile spikelets about 3 mm. long, pilose, especially on and near the rather rounded keels; awnless. Pedicellate spikelets greatly reduced, the aborted glume short-pubescent near the apex, pedicels densely long-villous. LA PAZ: SUR YUNGAS: Chulumani, 1600 m., *Hitchcock* 22659 (GH).



7. *A. saccharoides* Swartz, Prodr. 26 (1788). Culms tufted, to 1 m. tall, nodes hispid. Leaf-blades glabrous (occasionally some pubescence present), glaucous. Inflorescence to 15 cm. long, exserted, mostly silvery-white, silky-villous, the rachis-joints long-villous. Sessile spikelet about 5 mm. long, the first glume pilose on the keels; awn twisted below, 1(-1.5) cm. long. Pedicellate spikelets somewhat reduced, the pedicels long-villous. LA PAZ: MURILLO: Obrajes, 3400 m., *Buchtien* 574 (GH). COCHABAMBA: CERCADO: Cochabamba, *Hitchcock* 22794 (GH); Quillacolla: Liriuni, 3000 m., *Steinbach* 9847 (GH).

7a. *A. saccharoides* subsp. *laguroides* (DC.) Hack. in DC. Monogr. Phan. 6: 495 (1889). *A. ternatus* var. *macrothrix* of the Catalogue. Culms shorter, nodes glabrous, and panicle smaller than in *A. saccharoides*. COCHABAMBA: CERCADO: Cochabamba, *Hitchcock* 22823 (Hitchcock).

7b. *A. saccharoides* subsp. *parvispiculus* Hitchc. in Contrib. U. S. Nat. Herb. 24: 497 (1927). *A. saccharoides* var. *barbinodis* of the Catalogue. Panicle longer, gray or purplish, sessile spikelets 3-4 mm. long. Leaf-blades often pubescent. LA PAZ: LARECAJA: Sorata, 2600-2700 m., *Mandon* 1389 (GH); MURILLO: La Paz, 3300 m., *Bang* 102 (GH); La Paz, 3500 m., *Buchtien* 8846 (GH); SUR YUNGAS: La Florida, 1840 m., *Hitchcock* 22615 (GH). COCHABAMBA: MIZQUE: Vila-vila, 2500 m., *Eyerdam* 24975 (GH).

7c. *A. saccharoides* subvar. *perforatus* (Trin.) Hack. in DC. Monogr. Phan. 6: 496 (1889). First glume of sessile spikelet with a supramedi-  
dial dorsal pit. Otherwise like *A. saccharoides*. COCHABAMBA: CERCADO: Cochabamba, *Holway* 325 (Hitchcock).

8. *A. altus* Hitchc. in Contrib. U. S. Nat. Herb. 17: 208 (1913). Culms mostly solitary, the nodes bearded, to 1-2 m. high. Leaf-blades flat, linear, scabrid, with a few long hairs at base of upper surface. Panicle oblong, to 2 dm. long, greenish-white, rachis-joints densely long-villous. Sessile spikelet to 5 mm. long, the glabrous first glume with a supramedi-  
dial dorsal pit; awn to 2 cm. long. Pedicellate spikelet greatly reduced, the pedicel long-villous. LA PAZ: NOR YUNGAS: Milliguaya, *Buchtien* 4258 (Hitchcock).

9. *A. bicornis* L. Sp. Pl. 1046 (1753). Culms to 1-2 m. tall, the nodes glabrous. Leaf-blades flat, linear, long-attenuate, scabrid. Inflorescence a corymbose, feathery, villous panicle, rachis-joints long-villous. Sessile spikelets about 3 mm. long, the first glume glabrous. Pedicellate spikelets greatly reduced, the pedicels long-villous. LA PAZ: LARECAJA: Hacienda Simaco, 1400 m., *Buchtien* 5312 (GH); NOR YUNGAS: Polo-Polo, near Coroico, 1100 m., *Buchtien* (in 1912) 204 (GH); Milliguaya, 1300 m., *Buchtien* (in 1917) 204 (GH). SANTA CRUZ: SARA: Buenavista, 450-500 m., *Steinbach* 5274 (GH), 6949 (GH).

10. *A. leucostachyus* HBK. Nov. Gen. & Sp. 1: 187 (1816). Densely tufted, the culms usually less than 1 m. tall, the nodes glabrous.



Leaf-blades linear, flat, glabrous. Inflorescence a rather short villous panicle, the rachis-joints long-villous. Sessile spikelet awnless, about 3 mm. long, the first glume ciliolate on the keels and sometimes puberulent on the upper portion. Pedicellate spikelets greatly reduced, the pedicels long-villous. LA PAZ: NOR YUNGAS: Milluguaya, 1200 m., *Buchtien* 735 (GH). SANTA CRUZ: SARA: Dolores, 450 m., *Steinbach* 1888 (GH); Buenavista, 450 m., *Steinbach* 6517 (GH), 6845 (GH), 6846 (GH), 6848 (GH).

11. *A. Selloanus* (Hack.) Hack. in Bull. Herb. Boiss. (ser. 2) 4: 266 (1904). Culms mostly less than 1 m. tall, nodes glabrous. Inflorescence a densely villous panicle, the rachis joints densely long-villous on the upper portion. Sessile spikelets awnless, to 4 mm. long, the first glume glabrous. Pedicellate spikelets greatly reduced, the pedicels densely long-villous. SANTA CRUZ: SARA: Buenavista, 450-500 m., *Steinbach* 1928 (GH), 5143 (GH), 6515 (GH), 6516 (GH), 6723 (GH), 6874 (GH), 6971 bis (GH).

12. *A. lateralis* Nees, Agrost. Bras. 329 (1829). Culms to 1 m. tall, often purple, the nodes glabrous. Leaf-blades flat, linear, the base not cordate, to 6 mm. wide, glabrous. Inflorescence of 2-4 racemes to 4 cm. long, the rachis-joints long-villous. Sessile spikelet to 4-5 mm. long, the first glume glabrous; awn to 1 cm. long. Pedicellate spikelet not reduced, about 4 mm. long, the pedicel long-villous. SANTA CRUZ: SARA: Río Quimory, 400 m., *Steinbach* 7328 (GH); Buenavista, 450-500 m., *Steinbach* 5427 (GH), 6851 (GH).

13. *A. cordatus* Swallen in Contrib. U. S. Nat. Herb. 29: 275 (1948). Culms to nearly 2 m. tall. Leaf-blades glabrous, linear-attenuate, the base 15-20 mm. wide and cordate. Inflorescence to 5 dm. long, racemes to 4.5 cm. long, the rachis-joints villous. Sessile spikelet to 4 mm. long, the first glume glabrous; awn to 1.5 cm. long. Pedicellate spikelets to 6.5 mm. long, the pedicel long-villous. COCHABAMBA: TOTORA: Chimoré, 1000 m., *Cárdenas* 2083 (US; type).

14. *A. leptocladus* Hack. in Flora, 68: 122 (1885). Culms to 4 dm. high, the nodes short-hispid. Leaf-blades bristly-pilose at base, pubescent on both surfaces (at least when young), linear, long-attenuate. Inflorescence exserted, of few racemes, the rachis-joints long-hispid. Sessile spikelet about 6 mm. long, the first glume glabrous or with a few short hairs near the base; awn strongly geniculate, to 4 cm. long. Pedicellate spikelet to 5-6 mm. long, the short pedicel bilaterally ciliate. SANTA CRUZ: SARA: Río Guendá, 400 m., *Steinbach* 7939 (GH).

### 100. *Hyparrhenia* Anderss.

*Hyparrhenia bracteata* (Humb. & Bonpl. ex Willd.) Stapf in Prain, Fl. Trop. Afr. 9: 360 (1918). Perennial, to 1 m. high, or more. Leaf-blades long, linear, narrow (to 4 mm.), appressed-pilose beneath. Inflorescence terminal, to 3 dm. or more, a complex panicle of paired



racemes, these subtended by narrow pilose bracts, 1-2.5 cm. long, the ultimate racemes few-flowered. Spikelets 1-flowered, paired, 1 sessile, fertile, and awned, the other (sometimes 2) pedicellate, the pedicel long-villous, sterile and awnless; disarticulation below the glumes. Fertile spikelet: about 6 mm. long (excluding the awn), the glumes somewhat indurate; first glume with involute margins, bidentate, a few longish hairs near the apex, second glume similar but not bidentate; fertile lemma thin, delicate, shorter than the glumes, the subplumose awn to 2.5 cm. long, loosely twisted. Sterile spikelet: shorter than the fertile, not bidentate, the apices pubescent and subaristate. LA PAZ: SUR YUNGAS: Chulumani, *Hitchcock* 22704 (Hitchcock).

### 101. *Sorghum* Moench

*Sorghum vulgare* Pers. Synops. Pl. 1: 101 (1805). Robust annual, the culms to 1.5 m. high. Leaf-blades long, 2-6 cm. wide, glabrous. Inflorescence a terminal panicle, often condensed, of several few-jointed racemes, these tardily disarticulating. Spikelets paired, the perfect spikelet sessile, the staminate or sterile spikelet pedicellate. Perfect spikelet: glumes subequal, about 5 mm. long, broadly ovate, the first glume few-nerved, more or less shortly silky-villous, the second glume indurate, shining; lemma shorter than the glumes, awned, the awn geniculate, basally twisted, to 1 cm. long, quickly deciduous. Sterile spikelet: pedicel villous, glumes 3-4 mm. long, few-nerved, very sparsely villous. LA PAZ: NOR YUNGAS: Coroico, *Buchtien* 3615 (Hitchcock).

The perennial *S. halepense* (L.) Pers. Synops. Pl. 1: 101 (1805) may also be found. It has an extensive, creeping, scaly rhizome and, in general, is somewhat more robust than is *S. vulgare*.

### 102. *Sorghastrum* Nash

Perennials, to 1 m. high, the culm-nodes pubescent to shortly villous, the leaf-sheaths rather prominently auriculate, the blades glabrous to scabrid. Inflorescence a panicle of short racemes, the rachis disarticulating. Spikelets paired, the perfect spikelet sessile or subsessile, the sterile spikelet reduced to a pubescent or villous pedicel. Glumes coriaceous, the fertile lemma hyaline, awned.

- a. Awn to 8 cm. long. .... 1. *S. minarum*.
  - a. Awn much less than 8 cm. long.
    - b. Awn less than 1 cm. long, straight or once geniculate, not tightly twisted at base. .... 2. *S. parviflorum*.
    - b. Awn to nearly 2 cm. long, twice geniculate, tightly twisted at base. .... 3. *S. stipoides*.
1. *Sorghastrum minarum* (Nees) Hitchc. in Contrib. U. S. Nat.



Herb. 24: 501 (1927). Leaf-blades long, mostly flat. Panicles rather dense, somewhat spicate in appearance. Perfect spikelet: glumes equal or subequal, obtuse, to 1 cm. long, the first glume glabrous to sparsely villous on the upper portion, the apex shortly ciliate; second glume glabrous, the apex shortly ciliate. Awn once or twice geniculate, the basal portion tightly twisted, plumosely ciliate, dark brown, the upper portion light brown, straight, shortly scabrid-pubescent. SANTA CRUZ: SARA: Buenavista, 450-500 m., *Steinbach* 5430 bis (GH), 7028 (GH).

2. *S. parviflorum* (Desv.) Hitchc. & Chase in Contrib. U. S. Nat. Herb. 18: 287 (1917). Tufted, the leaf-blades flat to involute. Panicle more open, the pedicels and spikelet-bases villous. Perfect spikelet: glumes subequal, 4-5 mm. long, subacute, glabrous or the first glume sparsely villous. Awn glabrous to faintly scabridulous. SANTA CRUZ: SARA: Buenavista, 450-500 m., *Steinbach* 1819 (GH), 5428 (GH), 6984 (GH), 7050 bis (GH).

3. *S. stipoides* (HBK.) Nash, N. Amer. Fl. 17: 129 (1912). Slender, leaf-blades narrow, convolute. Perfect spikelet: glumes equal, 5-6 mm. long, subobtuse, the first glume sparsely villous. Awn light brown, the tightly twisted basal portion somewhat plumose-ciliate. LA PAZ: LARECAJA: vic. Sorata, *Mandon* 1382 (Hitchcock). SANTA CRUZ: VALLEGRANDE: Vallegrande, *Herzog* 1789 (Hitchcock).

### 103. *Heteropogon* Pers.

Perennial or annual. Racemes solitary, digitate, or subdigitate. Staminate spikelets pedicellate, awnless, paired (2-5 pairs) on lowest portion of rachis, this remaining entire. Fertile spikelets sessile, 2-flowered, awned, the lower floret a sterile lemma, each paired with a pedicellate staminate spikelet above the paired staminate spikelets, the rachis disarticulating obliquely, leaving a sharp villous callus below each fertile spikelet.

a. Racemes 2-7, digitately arranged (occasionally solitary on axillary branches); awns to 5 cm. long; pedicels villous. .... 1. *H. villosus*.

a. Racemes solitary; awns 12-15 cm. long; pedicels glabrous.

b. Glumes all glandless. .... 2. *H. contortus*.

b. First glume of staminate spikelets with a dorsal row of punctate glands. .... 3. *H. melanocarpus*.

1. *Heteropogon villosus* Nees, Agrost. Bras. 362 (1829). *Andropogon villosus* and *Agenium villosum* of the Catalogue. Perennial, erect or spreading, the culms to 1 m. tall, nodes pubescent to villous. Leaf-sheaths pubescent to glabrate, ciliate, the linear acute blades to 10 cm. long and 4 mm. wide, pubescent above and beneath. Inflorescence a terminal panicle of 2-7 digitately or subdigitately arranged racemes on villous peduncles to 1 cm. long, the racemes to 3 cm. long (excluding awns). Staminate spikelets: pedicels villous; first glume to 6 mm. long, acute, hispid to papillate-hispid on upper portion,



many-nerved; second glume somewhat shorter, glabrous, thin-textured, several-nerved; lemma shorter, hyaline, ciliate, the hairs soft and curling. Fertile spikelets: 5 mm. long, excluding awns; first glume 4.5 mm. long, obtuse, villous, only slightly papillate; second glume slightly shorter, acute, sparsely pubescent; lemma about 3 mm. long, thin, terminated by an awn 2.5-5 cm. long, basally twisted, geniculate, ultimately straight, pubescent to apically puberulent. SANTA CRUZ: CERCADO: Santa Cruz, *Herzog* 1308 (Hitchcock).

2. **H. contortus** (L.) Beauv. ex Roem. & Schult. Syst. Veg. 2: 836 (1817). Perennial, to 8 dm. or 1 m. tall, the culms compressed, nodes glabrous. Leaf-sheaths glabrous, carinate, the linear, acute blades to 15 cm. long and 7 mm. wide, scabridulous above but scarcely so beneath. Inflorescence a terminal, 1-sided raceme about 5 cm. long (excluding awns). Staminate spikelets imbricate, to 1 cm. long, pedicels glabrous; first glume to 1 cm. long, acute, finely short-ciliate, sparsely papillate-hispid above, many-nerved; second glume nearly as long, thin, 1-nerved, glabrous; lemma shorter, hyaline. Fertile spikelets to 7 mm. long; glumes equal, the first brown, densely pubescent, enclosing the second; lemma short, bearing a geniculate, basally twisted awn to 12 (-15) cm. long, the base pubescent to plumose, the apex finely puberulent. LA PAZ: NOR YUNGAS: Coripata, *Hitchcock* 22678 (GH). CHUQUISACA: SUR CINTI: Camataquí, 2500 m., *Fiebrig* 3074 (GH).

3. **H. melanocarpus** (Ell.) Benth. in Journ. Linn. Soc. Bot. 19: 71 (1882). Annual, to 2 m. tall. Leaf-sheaths glabrous, carinate, the keel with a row of small glands, especially on sheaths of upper leaves, the lance-linear blades to 30 cm. long and 1 cm. wide, scabrid above and beneath. Inflorescences often densely crowded in upper leaves, the racemes to 6 cm. long (excluding the awns); inflorescence to 2-3 dm. long. Staminate spikelets to 1.5-2.5 cm. long, glabrous, the pedicels glabrous; first glume acute, many-nerved, the margins hyaline, with a dorsal line of flat punctate glands in the middle of the glume. Fertile spikelets about 7-10 mm. long; glumes equal, firm, subacute to obtuse, dark brown, pubescent; lemma shorter, thin, bearing a 10-12 cm. geniculate awn, the base twisted, pubescent to subplumose, the upper half straight, puberulent. LA PAZ: NOR YUNGAS: Coripata, *Hitchcock* 22678 (GH).

#### 104. **Trachypogon** Nees

Perennials. Racemes terminal, 1-3 in an inflorescence, the rachis disarticulating. Spikelets paired, the staminate spikelet awnless, sessile or nearly so, persistent; perfect spikelet awned, pedicellate, the pedicel disarticulating, leaving a sharp villous callus below the spikelet.

a. Leaf-blades glabrous to scabrid.

b. Racemes usually solitary; awn pubescent; glume of staminate spikelet pubescent. .... 1. *T. montufari*.



- b. Racemes 2-3; awn plumose; glume of staminate spikelet glabrous. .... 2. *T. plumosus*.  
 a. Leaf-blades villous. .... 3. *T. canescens*.

1. **Trachypogon montufari** (HBK.) Nees, Agrost. Bras. 342 (1829). *T. polymorphus* var. *bolivianus* Pilger in Engler, Bot. Jahrb. 27: 22 (1899). Culms to 1 m. tall, the nodes hispid to villous. Leaf-sheaths glabrous, auricles erect, to 1 cm. long, the flat or involute blades to 8 mm. wide, shorter than the inflorescence, glabrous but scabridulous. Inflorescence usually a solitary raceme to 15 cm. long. Staminate spikelet: first glume to 7 mm. long, subacute, dorsally rounded, many-nerved, sparsely pubescent and shortly hispid-ciliate; second glume to 8 mm. long, acute, few-nerved, glabrous or softly and sparsely pubescent along the margins; lemma shorter, hyaline, long-ciliate, the hairs soft. Perfect spikelet: glumes nearly equal, to 7-8 mm. long, few-nerved, firm-textured, pubescent; lemma shorter, hyaline, the geniculate awn to 6 cm. long, densely long-pubescent, the hairs shorter toward the apex. Bolivian Plateau: *Bang* 1079 (GH; type-number of *T. polymorphus* var. *bolivianus*). SANTA CRUZ: SARA: Buenavista, 500 m., *Steinbach* 5379 (GH). TARIJA: ARCE: Camacho, *Fiebrig* 2864 (GH).

2. **T. plumosus** (Humb. & Bonpl. ex Willd.) Nees, Agrost. Bras. 344 (1829). Taller than *T. montufari*; racemes 2-3 (rarely 1); awn plumose; first glume of staminate spikelet glabrous. LA PAZ: LARECAJA: Hacienda Casana, *Buchtien* 7145 (Hitchcock).

3. **T. canescens** Nees, Agrost. Bras. 343 (1829). Very similar to *T. montufari*, but the leaf-sheaths sparsely hispid to papillate-hispid, the involute blades villous. Awn plumose, at least below. LA PAZ: NOR YUNGAS: Puente Villa, 1700 m., *Cárdenas* 3613 (GH). SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 6947 (GH).

### 105. **Elyonurus** Humb. & Bonpl. ex Willd.

Perennial, up to 1 m. tall, the terminal racemes usually solitary, to 10-15 cm. long, often much shorter, the rachis ultimately disarticulating. Spikelets paired, awnless; staminate spikelet pedicellate; perfect spikelet sessile, appressed against the rachis; spikelet-pairs falling attached to a rachis-joint. Glumes entire or bidentate, slightly glandular on the marginal nerves; lemmas hyaline, thin-textured; palea obsolete.

First glume of staminate spikelet entire. .... 1. *E. adustus*.  
 First glume of staminate spikelet bidentate (sometimes only slightly so.) .... 2. *E. tripsacoides*.

1. **Elyonurus adustus** (Trin.) Ekman in Ark. Bot. 13(10): 6 (1913). Caespitose, the bases slightly bulbous. Leaf-sheaths glabrous, the linear, flat or inrolled, scabridulous leaf-blades to 4 mm. wide, shorter than the inflorescence. Raceme-rachis and pedicels pubescent to villous. Staminate spikelets: glumes subequal, about 5 mm. long, entire, acute,



the first glume more or less densely hirsute and hispid-ciliate on the submarginal keels, the margins enclosing the second glume, the second glume slightly shorter, pubescent, few-nerved, the upper margin sparsely ciliate with soft curling hairs. Perfect spikelets: glumes subequal, the first glume about 6 mm. long, acute, densely hispid-villous, the second glume slightly shorter, pubescent. LA PAZ: LARECAJA: Hacienda Casana, 1600 m., *Buchtien* 7138 (GH); NOR YUNGAS: Polo-Polo, near Coroico, 1100 m., *Buchtien s. n.* (GH). SANTA CRUZ: SARA: Buenavista, 450-500 m., *Steinbach* 5244 (GH), 5404 (GH), 6620 bis (GH), 6641 (GH), 6642 (GH), 6875 (GH); near Portachuelo, 400 m., *Steinbach* 3136 (GH).

2. *E. tripsacoides* Humb. & Bonpl. ex Willd. Sp. Pl. 4: 941 (1806). *E. tripsacoides* var. *ciliaris* (HBK.) Hack. in DC. Monogr. Phan. 6: 333 (1889). *E. tripsacoides* var. *brevidentatus* Hack. in DC. Monogr. Phan. 6: 334 (1889). Very similar to *E. adustus*, but the bases often more bulbous and shortly rhizomatous. Leaf-blades somewhat pilose above, near the base. First glume of staminate spikelet bidentate, sometimes only shortly so. COCHABAMBA: CERCADO: 5 km. southeast of Cochabamba, 2800 m., *Eyerdam* 24914 (GH); Arani, 2700 m., *Cárdenas* 2382 (GH). SANTA CRUZ: SARA: Buenavista, 400-450 m., *Steinbach* 3270 (GH), 6514 (GH), 6895 (GH), 6896 (GH). TARIJA: ARCE: Camacho, 2500 m., *Fiebrig* 2577 (GH).

Three forms are known in Bolivia. The first glume of the staminate spikelet may be glabrous and strongly ciliate (typical), pubescent (var. *brevidentatus*) or villous (var. *ciliaris*).

The generic name is often spelled *Elionurus*, but I have retained the original spelling, *Elyonurus*.

## 106. *Manisuris* L.

Perennials, often tall, in moist or wet places. Leaves glabrous, culms glabrous. Inflorescences racemes, these sometimes aggregated in the upper leaf-axils. Spikelets awnless, paired on a disarticulating rachis, the perfect spikelet sessile, appressed against or adnate to the rachis, the sterile spikelet pedicellate or reduced to a pedicel only; glumes firm, coriaceous, lemma and palea hyaline.

First glume of perfect spikelet bidentate, foveolate-pitted on lower half. .... 2. *M. aurita*.

First glume of perfect spikelet not bidentate, not foveolate-pitted. .... 1. *M. altissima*.

1. *Manisuris altissima* (Poir.) Hitchc. in Journ. Wash. Acad. Sci. 24: 292 (1934). *M. fasciculata* (Lam.) Hitch. in Amer. Journ. Bot. 2: 299 (1915). Culms to 1 m. tall. Leaf-blades flat or folded, to 5 mm. wide; apex of leaf-sheaths densely long-ciliate, base of blades sparsely



short-ciliate. Racemes to 10 cm. long, usually shorter, the rachis rather tardily disarticulating. Perfect spikelet: glumes unequal, first glume 5-7 mm. long, abruptly acute or subobtuse, 9-11-nerved, the nerves rather prominent, the keel narrowly winged on the upper portion, second glume about 1 mm. longer, long-acute, few-nerved, the margins inflolded, with the glume thus somewhat cucullate. Sterile spikelet: glumes short and equal, otherwise resembling the perfect spikelet. LA PAZ: SUR YUNGAS: Espía, *White* (M. E.) 627 (Hitchcock).

2. *M. aurita* (Steud.) Hitchc & Chase in Contrib. U. S. Nat. Herb. 18: 276 (1917). Culms to 1-1.5 m. tall. Leaf-blades flat or folded, to 8 mm. wide, usually narrower, glabrous. Racemes to 10 cm. long, usually less, the base often partially enclosed by a leaf-sheath, the rachis quickly disarticulating. Perfect spikelet: glumes unequal, the first glume 3-4 mm. long, wing-margined above, bidentate, the teeth broad and overlapping, usually foveolate-pitted on the lower half (some glumes occasionally not pitted), nerves not conspicuous, second glume much shorter, the keel winged or at least pronounced, other nerves absent or inconspicuous. SANTA CRUZ: SARA: Buenavista, 450 m., *Steinbach* 6973 bis (GH).

### 107. *Hackelochloa* O. Ktze.

*Hackelochloa granularis* (L.) O. Ktze. Rev. Gen. 2: 776 (1891). A much-branched annual, 3-10 dm. high, coarsely hirsute on leaf-sheaths and blades, the sheaths papillate, the blades ciliate. Inflorescences axillary and terminal racemes (often fascicled) to 2.5 cm. long. Spikelets paired, the lower sessile and perfect, clasping the pedicel of the upper, this sterile or staminate; disarticulation in the rachis. Fertile spikelet: first glume about 1 mm. long, globose and globosely pitted or alveolate, finely and minutely puberulent, indurate, concealing the second glume and lemma. Sterile spikelet: glumes equal, about 2 mm. long, broadly lanceolate, several-nerved, not indurate, bicarinate, the keels ciliolate, the margins of the first glume partially enclosing the second glume. SANTA CRUZ: SARA: Monte de Palometillas, 400 m., *Steinbach* 2363 (GH); Buenavista, 800 m., *Steinbach* 5301 (GH). LA PAZ: LARECAJA: vic. Sorata, *Bang* 1310 in part (GH); NOR YUNGAS: Milliguaya, 1300 m., *Buchtien* 4189 (GH).

### 108. *Tripsacum* L.

*Tripsacum australe* Cutler & Anderson in Ann. Missouri Bot. Gard. 28: 259 (1941). *T. dactyloides* of the Catalogue. Tall perennial, the culms to 2 m. high. Leaf-sheaths pilose at the margins and at the auricled apex, tomentose within; leaf-blades long, flat, to 4 cm. wide, subpetiolate at the base. Inflorescence terminal, of 1-4 spikes, staminate spikelets above the pistillate, but on the same rachis. Pistillate



spikelets solitary at the nodes, embedded in the axis, with 1 fertile floret and 1 sterile lemma; first glume coriaceous, about 5-10 mm. long, the margin ciliate at base, covering the spikelet, the second glume similar but smaller; fertile lemma shorter than the glumes, hyaline. Staminate spikelets paired at the nodes of rachis, both sessile or 1 pedicellate; glumes firm, chartaceous, about as long as the pistillate glumes. LA PAZ: NOR YUNGAS: Coroico, 1560 m., *Hitchcock* 22721 (GH).

### 109. *Coix* L.

*Coix lachryma-jobi* L. Sp. Pl. 972 (1753). Tall perennials (or sometimes annual ?), branched, the culms to 1 m. high. Leaf-blades much exceeding the inflorescences, to 4 cm. wide, lance-ovate, the base cordate-clasping. Inflorescence long-pedunculate, of 2-3 short pistillate spikelets at the base, enclosed in a hard bony involucre to 1 cm. long, only the spikelet-tips exerted; staminate spikelets usually 3, on a slender axis ultimately exerted from the involucre, the whole raceme about 1 cm. long. COCHABAMBA: CHAPARE: Espiritu Santo, *Buchtien* 2521 (*Hitchcock*).

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